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DECENTRALIZED STATE/FEDERAL LEVEL  
EMERGENCY EVACUATION MANAGEMENT CENTERS

FINAL REPORT

for  
Federal Emergency Management Agency  
Washington, D.C. 20472

FEMA AWARD NUMBER EMW-C-0687

FEMA WORK UNIT 2312-H

August 1982



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Detachable Summary

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**DECENTRALIZED STATE/FEDERAL LEVEL**  
**EMERGENCY EVACUATION MANAGEMENT CENTERS**

by:

R.A. Harker  
A.E. Wilmore  
SYSTAN, Inc.

for:

Federal Emergency Management Agency  
Washington, D.C. 20472  
Contract No. EMW-C-0687  
FEMA Work Unit 2312-H

D182

August 1982

**FEMA Review Notice**

"This report has been reviewed in the Federal Emergency Management Agency and approved for publication. Approval does not signify that the contents necessarily reflect the views and policies of the Federal Emergency Management Agency."

## DETACHABLE SUMMARY

### RESEARCH FINDINGS AND CONCLUSIONS

#### S.1 BACKGROUND FOR THE RESEARCH

Earlier research studies revealed local weaknesses which led to the concept of a middle management center (MMC). The MMC would coordinate the emergency activities of each evacuation area. It would function as a clearinghouse for intelligence and as a decisionmaking body for the allocation of relocation area personnel and resources. The centers would also serve as a focal point for contacts with state and federal government agencies. They would not duplicate local personnel and operations at present EOC's.

The objective of this research was to investigate the roles of federal/state level MMC's to serve emergency evacuation operations. The analyses considered the background and field conditions, the functions and techniques, and the benefits and feasible means to implement the centers.

Though it is generally accepted that all state and local jurisdictions should be capable of conducting coordinated operations during major emergencies, it is also generally accepted that most local jurisdictions have limited capabilities to prepare special countermeasures for all contingencies. A long history of traditional and legal practices underlies the present structure of emergency organizations in the United States. Local fire, law enforcement and health agencies are structured to deal with moderate disasters at the local jurisdictional levels. Military bases and federal agencies have traditionally supported adjacent civil populations. National guard units, either under state or federal control, have been used for disaster mitigation, control, and relief, and to provide personal and property security. The prestige and financial resources of federal organizations are the bases for significant impact on the policies and procedures of local organizations.



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The present emergency management environment may be characterized briefly as follows:

- Federal, state and local governments share emergency responsibilities. Local jurisdictions have basic responsibility for handling moderate disasters within their areas, and normally function effectively with little outside assistance. Should the disaster extend beyond a local jurisdiction, or should it become of greater magnitude than the local officials can handle, the state becomes involved by coordinating and providing resources. Should the disaster reach proportions that overwhelm local government, the state may assume operating responsibility.
- The federal government does not have an extant centralized emergency civil operations management capability. Its authorities and responsibilities are distributed among many agencies. Federal response to state and local emergency needs is typically provided by local military commanders and the heads of federal field agencies on a decentralized basis. The federal government normally acts in a coordinative and supportive role.
- The present, established graduated disaster response systems have worked adequately in the past. Therefore, only considerations of more severe hazards -- "catastrophic disasters" -- can justify the need for a more effective response system.
- Relevant characteristics of catastrophic disasters include severe hazards to large numbers of victims over wide geographical areas; primary and secondary effects lasting long enough so that emergency operations may have to be sustained indefinitely; potential, but uncertain, warning to allow identification of hazard areas; and infrequency to preclude extensive experience with their effect and countermeasures. Possible catastrophic disasters include nuclear warfare, nuclear materials accidents, hurricanes, earthquakes (secondary effects), and the cumulative effects of lesser disasters. Except for an actual attack, nuclear war crisis relocation is the most severe condition because it affects the entire nation simultaneously.
- Pre-disaster modification from the present attitudes (and legal authorities) of a passive advisory role to an active central management role for federal civil emergency operations (FEMA) is a prerequisite to establishing a more effective state/federal management system. Recognition and acceptance is needed at all

levels of government and industry of requirements for coordinated response to catastrophic disasters, including the need for pre-disaster organization, planning and training.

## **S.2 EVALUATION OF PRESENT EMERGENCY MANAGEMENT SYSTEM**

Present emergency management concepts and organizations have evolved to meet recurring disaster hazards. Initial responsibility is borne by local organizations, with higher level organizations becoming involved as the severity and extent of the hazard increases. Following the declaration of a state of disaster by a Governor and the President, state and federal civil and military agencies typically commit resources from local and regional levels. The federal activities to support local government remain under the direction of each agency's hierarchy, sometimes coordinated on an ad hoc basis by a lead agency designated by the President. While this system has worked adequately in the past, it has not resulted in a centralized state/federal level organization with trained personnel, procedures and resources.

Evaluation of the emergency evacuation management structure indicates several weaknesses according to accepted organization principles and criteria:

- The overall effect of large-scale emergency evacuation is to disperse population, resources and organizations. Present emergency management planning is to decentralize middle and operating management to host areas and to centralize decisionmaking management in state-level (or state/region-level) agencies.
- This change shortens the chain of command, which broadens the span of control. Typically, more reliable information, more competence and capacity and clearer lines of authority and coordination are required for this type of organization.
- Anticipated and real catastrophic hazard effects, and the evacuation itself will decrease production and distribution capabilities. Separation of risk area personnel from their normal resources, jurisdictions and organizations will tend to produce conflicts of authority at operating and middle management levels. System reliability and confidence will decrease, and personnel will be faced with unfamiliar decision responsibilities. Significance (cost of mistakes) of decisions, will increase. Thus, middle and top-level

management coordination and support requirements will increase.

- The number of demands and amount of information passed up from operating to middle and top-levels will increase, as will the decisions and controls passed down. There will be increased needs for horizontal coordination between both public and private agencies. Normal communication channels will be lengthened, intelligence systems will be disrupted, and normal "clearinghouses" to compile information and authenticate authority will be eliminated. Public information sources will be independent of local control and coordination. Disaster conditions will be unfamiliar and news will be subject to various interpretations. An extraordinary burden will be placed on all communications facilities.

Considering the requirements relative to the resources, capabilities, and flexibilities of present organizations, and to the expectation of moderate disasters, it is difficult to justify any modification of present organizational structure. Considering the requirements relative to large-scale emergency evacuation and catastrophic disasters, especially nuclear war crisis relocation, it is difficult to predict any outcome short of chaos.

### S.3 DECENTRALIZED FEDERAL/STATE MANAGEMENT STRUCTURES

Civil emergency activities involving evacuation of large numbers of people for prolonged periods are also recognizably different from normal civil (public and private) activities. The state or state/region coordinating centers are designed to meet the unique requirements imposed by these catastrophic disasters. The middle management centers would assume responsibility for activities and coordination not provided by normal government or private organizations. They would operate at a level (the evacuation area) broad enough to overview operating tasks of local organizations on a comprehensive basis. They would be close enough to local operations to have first-hand knowledge of local problems, priorities and needs. Properly staffed, they would reinforce (not dilute) the authorities of state and federal agencies and private organizations.

The nation would be divided into several hundred "evacuation areas" (including both risk and host cities and counties) based on existing state regions, risk/host

conglomerates and economic/trading area definitions. This state-region (or evacuation area) would be the first level emergency middle management center. Risk and host area jurisdiction operating units and organizational structures would be maintained. Host area organizations would manage increased demand by expanding operations with auxiliary personnel from the host area and relocatee population. This would be accomplished on a self-help, best-effort, training-on-the-job basis. Specialized risk area operating units would be maintained intact, (not dispersed as "fillers" for host organizations), except for those (e.g., schools) whose clientele were completely dispersed. These organizations would be employed to meet risk area needs or to be dispatched (at host area request and MMC direction) to offer contingent support. Unless prohibited by disaster effects, local public and private essential operations would be managed by department personnel at the usual dispatcher or headquarter sites.

State-region MMCs, formed for each evacuation area, would be delegated authority to act for federal and state governments, and to coordinate public and private organizations in all matters internal to the emergency evacuation area. Other regional middle-management organizations would operate from normal headquarters in communication with the MMC. The MMC also would be responsible for preparing and disseminating public information, for coordinating the upgrading and construction of fallout shelters, and for coordinating RADEF operations. Organization relations would vary between evacuation areas, states and regions of the country.

The MMC staff would include key representatives from local jurisdictions and essential federal, state and industrial organizations. It is important that the individual in charge be a person of stature capable to command public and private community respect. The representatives would coordinate intelligence and operations for jurisdictions on a functional basis. Suitable staff for the MMC should be experienced in emergency operations, competent to make decisions, and command respect at local, state and federal region levels. In addition, they should be intimately acquainted with major evacuation area transportation, communications, and utility networks, and the organizations (private, military, state and federal) that can restore critical outages. Pre-emergency selection, indoctrination and training of qualified personnel is essential.

The MMC should be sited to ensure physical protection and communication capacity. Ideally, it would be located at the population and transportation centroid of the

evacuation area, outside the risk area. A mobile MMC would provide flexibility, but would face complex problems. It should be of sufficient size to accommodate all essential communication equipment and personnel; be housed in a temporary protective facility to ensure initial survivability, and have preselected sites that can accommodate key officials.

State (and state-agency) headquarter operations might be relocated to secure facilities. They would coordinate activities between the state-region MMCs and would allocate state resources and personnel between evacuation areas. The national guard would be a vital state resource if it were not mobilized by the federal military.

Federal headquarter operations, while beyond the scope of this research effort, must be conceptualized because the activities of subordinate levels are designed to carry out the objectives, policies and directives of top-level authorities. FEMA's headquarters organizational alignment is viewed as similar to a headquarters military staff responsible for overseeing military operations in several theatres. The headquarters staff would not "operate" in the literal sense of the word; it would make major decisions as to what operations will be conducted, the emphasis and timing of operations, and level of support accorded to each region.

An "Operations Division" for FEMA Headquarters should be heavily staffed with representatives of the federal delegate agencies and the defense department. Civil emergency operations for catastrophic disasters are at least as important as military combat operations. The most expert representatives of those agencies should be detailed to FEMA, not in a loose liaison capacity but as an integral part of the FEMA Headquarters emergency operations division. They would function as the authorities on the organized emergency capabilities and material resources owned or controlled by their parent agencies. Thus, they would be in a position to both assess the feasibility of proposed nationally directed emergency activities and to expedite the organization and application of the resources. They could also distinguish between military and civil priorities.

Federal region coordination centers would represent the middle management level between FEMA and delegate agency headquarters and state and evacuation area centers. The federal regional coordination centers would be responsible for federal activities in each of the FEMA regions. As for the Headquarters, these federal region MMC's should be heavily staffed by personnel from the resource agencies, the military and large private



organizations. Operations of these supporting organizations, conducted at evacuation area level, could be directed from normal (or secure relocation) sites. The reorganizational role of regional centers would be to ensure that the major decisions of the Headquarters are implemented. They should know the resources and capabilities of the support organizations, assess the relative needs and priorities of the evacuation areas, and decide which resources to apply where.

To staff the federal regional centers, personnel are needed who are widely experienced in disaster operations, nuclear attack and natural disaster effects, and the probable severe environmental constraints in conducting emergency evacuation operations. These personnel preferably should have been heavily involved in the development of national civil emergency contingency plans, have a realistic knowledge of the organized and material resources likely to be available for conducting emergency operations, the ability to make sound decisions in the face of fragmentary operational situation information, and the ability to skillfully and accurately present requirements of the civil population to higher authority. Key personnel should be drawn from regional federal, state and civil agencies.

#### S.4 LOGIC TO ALLOCATE RESPONSIBILITIES TO MIDDLE MANAGEMENT CENTERS

The proposed organization structure was derived from analyses of decision requirements according to accepted organization theories. The structure appears to involve the fewest changes from normal organization structures, and it embodies reasonable dimensions to allow effective decisionmaking. Provision of two levels of emergency middle management centers (the federal and the state region levels) is based on considerations of decentralization and span of control. However, variations between individual areas will be so great as to preclude theoretical prejudgement. The management system can be refined only by accepting a concept of operations, establishing an organization structure and exercising the structure.

The declaration of an emergency or disaster condition would remain a political decision to be determined by governors and the President. Present procedures for escalating disaster effects would be followed (i.e., the local area responds first, if conditions worsen adjacent and higher level organizations become involved). The middle management centers would participate only in activities and to the extent that their unique capabilities

were required. Thus, most activities remain with local organizations operating within their jurisdictions. Allocation of decisions between the levels of the federal/state central and regional management structure will depend on qualitative considerations. Decisions requiring rapid response with on-hand resources will be made at evacuation area level. Decisions involving allocations and coordination between evacuation areas will be made at state or federal region level. Far-reaching decisions, such as economic and monetary controls, will be made at federal headquarters level.

#### S.5 BENEFITS OF MIDDLE MANAGEMENT CENTERS

To deal with the effects of catastrophies -- particularly war-caused -- there is need for direction and control of federal civil activities below Presidential level. At the present time the logical organizational slot appears to be FEMA because it already encompasses many federal emergency coordination and mitigation activities. The delegation of authority to FEMA headquarters and regional coordination centers to direct and coordinate federal activities to counter the effects of catastrophic disaster would not dilute Presidential-level authorities to mobilize and allocate resources. Nor would it dilute authorities of state and local governments to manage their activities -- rather it would provide interstate top-level administration, resource support and technical expertise on a coordinated basis.

Civil emergency activities involving evacuation of large numbers of people for prolonged periods are recognizably different from normal civil (public and private) activities. The state or state/region coordinating centers are designed to meet the unique requirements imposed by these catastrophic disasters. The middle management centers would assume responsibility for activities and coordination not provided by normal government or private organizations. They would operate at a level (the evacuation area) broad enough to overview operating tasks of local organizations on a comprehensive basis. They would be close enough to local operations to have first-hand knowledge of local problems, priorities and needs. Properly staffed, they would reinforce (not dilute) the authorities of state and federal agencies and private organizations.

Full-scale, all-hazard plans, while obviously an attractive ideal, are seldom achieved: they are expensive, require constant updating and must be adjusted to the particular event. They generally reflect routine

organization operations and relationships, and are too abstract and ponderous for rapid response to immediate threats. Local department heads respond to emergencies by applying personnel and resources according to standard operating procedures and observed hazards, most do not consult comprehensive contingency plans. A comprehensive contingency plan drawn in 1982 to deal with 1985 catastrophes are quickly obsoleted by environmental and personnel changes. Moreover, the actual catastrophe will seldom precisely fit the planning assumptions, and countermeasure procedures will be subject to modification. In another sense, such planning could be vital. Should the federal government implement the concept of emergency federal/state level middle management centers, contingency planning would keep the staffs steeped in the character of their problems, and would provide the basis for training exercises and definition of organization roles.

#### S.6 FEASIBILITY OF IMPLEMENTING MIDDLE MANAGEMENT CENTERS

FEMA staff members are well aware of the difficulties of initiating and maintaining emergency plans, management staff and operations capabilities when disasters are regarded as improbable events with uncertain consequences. While logically as much as possible should be accomplished as early as possible, it is likely that emergency preparation activities will remain low priority items for all levels of government. Thus, it must be conceded that it would be difficult to implement the proposed management structure under present conditions and attitudes.

At the same time, there is encouragement from the experiences of several states (such as Texas), with regional organization and from the apparent federal administration decisions to augment civil emergency preparedness fundings. FEMA's proposed FY'83 budget is almost double that for FY'82, supporting earlier reports that the President had decided to include civil defense as a part of a stronger strategic defense posture. The FY'83 budget request does not lay out planned funding for later years, but it does appear to represent initial funding for the D-prime program. While the D-prime program does not call for a comprehensive emergency evacuation management structure, any such program emphasis should revive interest in emergency management and provide a forum to consider management requirements. Should the D-prime program be implemented, it could also provide the necessary continuity to allow development of the management system to include MMC's.

FEMA officials, should the D-prime program be authorized and funded, could logically argue that now is the time and circumstance to change the present passive role of the agency to a leadership role. In this context, federal headquarters and regional operations staffs could be assembled. Out of the federal example, starting with already strong state regional organizations, model evacuation area middle management centers could be nurtured. This nucleus operations management structure could be activated for each declared emergency or disaster condition. Present contingency plans, resources and operations could be evaluated under less than national catastrophic conditions and conflicts and deficiencies ironed out. Local operating jurisdictions could observe middle and top-level organizations assuming responsibilities in a systematic manner with clear, centralized lines of authority. The demonstrated attributes should tend to overcome the negative attitudes which have impeded emergency preparedness programs in the past.

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## PREFACE

This is the final research report for the Federal Emergency Management Agency (FEMA) Contract Number EMW-C-0687. The work is part of a continuing research effort (Work Unit 2312-H) on emergency operations management by the FEMA Office of Research, National Preparedness Programs Directorate.

Robert A. Harker, the principal investigator, was responsible for the project design and its overall performance. Allen E. Wilmore contributed to all elements of the research, with emphasis on organization requirements and capabilities, and the field contacts.

The Contracting Officer's Technical Representative (COTR) was Mr. Stephen R. Birmingham who contributed to the research concept and study design, assisted by providing input data, and critically reviewed the research developments. Mr. James W. Kerr also assisted in his role as Director, Office of Research. Local, State and Federal regional officials assisted by contributing their insights to emergency evacuation requirements and feasibilities. The authors express their gratitude to all who assisted in this research endeavor.



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DECENTRALIZED STATE/FEDERAL LEVEL  
EMERGENCY EVACUATION MANAGEMENT CENTERS

## 1. SCOPE OF RESEARCH

### 1.1 OBJECTIVES

This study is part of the Federal Emergency Management Agency (FEMA) continuing research effort for Work Unit 2312-H. The work unit includes research to examine, evaluate and report on management requirements for emergency evacuation operations to counter the hazards of catastrophic disasters. This report covers the research procedures, analyses and conclusions developed under FEMA Contract EMW-C-0687.

As stated in the contract, the objective of this research is to investigate the roles of middle management centers, decentralized to serve risk-host area conglomerates. The investigation includes functions, management techniques, and feasible planning and implementation of the centers. The contract specifies that the effort should study the background and field conditions involved in establishing decentralized middle management centers for the coordination of state and federal emergency evacuation activities. The work is to include the following tasks and considerations:

1. Review emergency evacuation studies, reports and guidance materials to establish an information base. Investigate recent research findings, including reports on local emergency evacuation management requirements and concepts.
2. Investigate the management and coordination requirements of state and federal agencies for disasters involving potential or actual emergency evacuation.
3. Indicate the management interfaces between state and federal agencies with private (and quasi-private) organizations also involved in potential or actual emergency evacuation.
4. Define the functions of decentralized middle management centers to coordinate federal, state and private plans and operations.

5. Integrate the findings of Tasks 3 and 4 with findings of earlier research on the management requirements for risk and host jurisdictions. Develop a logical pattern defining responsibilities and decision levels for escalating levels of disaster response.
6. Conduct field tests with local, state, and federal agency representatives to validate the preliminary findings of the research.
7. Integrate the findings of the research field tests and other parallel studies, and prepare analyses and conclusions regarding beneficial roles for decentralized middle management centers. Consider the feasibility of implementing the centers under various crisis conditions.
8. The geographical area in which the work is to be accomplished is at the discretion of the contractor.

The approach to this study of state/federal middle management centers is outlined in Section 1.3. The overall report describes the study data, analyses and conclusions. Specific tasks of the contract objectives are reported as follows.

1. Pertinent materials from past research are reported in Sections 2 and 3.
2. Management and coordination requirements are explored in Sections 3 and 4.
3. Management interfaces are analyzed in Section 4.
4. The functions of the centers are reported in Section 5.
5. The findings of Tasks 3 and 4 are integrated with earlier research in Section 5, including escalating levels of response.
6. Field tests (Task 6) were conducted and the results are integrated (Task 7) throughout the report.
7. The benefits and feasibility of the centers are reported in Section 6.
8. Geographical areas for the work are covered in Section 1.3.

## 1.2 BACKGROUND

Recent studies of emergency evacuation management requirements at local government levels (Reference 1 and 2) provide background material and conclusions relevant to this study. Those studies determined that, because of the magnitude of the impact of the relocated population on the host area, local civil defense and emergency service officials cannot be expected, by themselves, to perform all required evacuation functions. They will have to rely on outside personnel and resources, drawn from other government and private organizations. Supplemental support may be available from state and federal government agencies and from public utilities and other regional organizations.

Present planning visualizes that the supporting personnel and resources will move to host counties and will be subject to local jurisdiction control. Allocations will be managed at the state level. When these plans are considered in relation to moderate hazard levels, to the resources, capabilities and flexibilities of present organizations, and to evacuation objectives, it is difficult to justify any modification of the present organizational structure. However, the weaknesses may become critical if catastrophic disasters require emergency evacuations that involve large areas, many people, long-term staying power and intense preparations for post-hazard survival.

A major conclusion of the earlier research studies was that there is need for an intermediate level of coordination and support for each evacuation area (the risk areas and their associated host areas). The intermediate level would involve management centers, similar to those called for in this contract. These are variously referred to as middle management, emergency evacuation and decentralized state/federal centers. (This is not to be confused with the basic concept of Emergency Operating Centers, EOC's, currently in operation at various levels of government.) The middle management concept is compatible with current FEMA investigations of communications and EOC support for crisis relocation. An important consideration is to recognize the needs for a flexible approach to emergency evacuation management to "customize" organizational structures according to local conditions.

The latest emergency evacuation management research and planning guidance has advanced to enumerate the tasks required in risk and host areas, to identify responsible persons and organizations, and to outline schedules of recommended activities (as in References 3, 4 and 5). These involve a broad spectrum of activities to be performed by heterogeneous groups, under leaders unfamiliar

with their roles and their environments. This contract recognizes an urgent need to investigate and devise coordinated state/federal level management and support concepts.

### 1.3 TECHNICAL APPROACH

The technical approach to meet the research objectives was comprised of six interrelated tasks:

- Task 1: Develop Work Plan
- Task 2: Analyze Management Requirements
- Task 3: Develop Emergency Management Center Structure
- Task 4: Conduct Field Tests
- Task 5: Define Feasibility and Benefits of Centers
- Task 6: Prepare Final Report

Task 1: Prepare Work Plan. Following an initial meeting with FEMA representatives, a formal work plan was prepared which reflected current FEMA concerns, addressed regional and state planning problems, and contained detailed descriptions of study tasks, task schedules, study milestones, personnel estimates, and the projected budget.

Task 2: Analyze Management Requirements. In developing planning and operating management requirements and concepts for risk and host areas (References 1 and 2), SYSTAN found many instances where there were apparent voids in the coordination and support of local activities by higher management levels. These findings were reinforced during the field contacts with local officials, and by reference to reports on the Three-Mile Island, Mt. St. Helens and Mississagua experiences.

The research required understanding and definition of potential hazard conditions, particularly those subject to widespread escalations, which may affect the transition of management from local to state and federal levels, and to higher levels of private management. It was necessary to identify the crisis or hazard characteristics triggering the evacuation event, such as adequate warning time.

State and local emergency plans, operations and organizations were investigated to determine their requirements and potential contributions to emergency management centers. State/federal requirements were defined to determine which might be met efficiently and effectively by an evacuation area emergency management center. In addition to the normal higher level management functions, provision must be made for the contingent deficiencies or breakdowns at local levels. This implies a capability to utilize resources and personnel from other local jurisdictions and from state and federal sources.

The relocation of population during an emergency evacuation would alter the geographical pattern of production and supply, and of the demands for goods and services. It would also alter the extent of demand, because the supply of goods and services would be restricted to those essential for survival. For the most part, those essential goods and services would be supplied by private companies that have developed organizational and operational arrangements -- both internal and intercompany -- that operate efficiently to meet the normal demand patterns.

The analyses of this phase of the research were conducted to identify the management interfaces between government agencies and essential private (and quasi-private) organizations. A potential benefit of decentralized emergency management centers was seen to be their close proximity to private organization headquarters, personal relations between government and corporate officials, and mutual familiarity with local problems and resources.

Task 3: Develop Emergency Management Center Structure.

This research element explored the structure of decentralized emergency management centers, developed a logic for assigning functions to the centers, and indicated the responsibilities of the centers in escalating disasters. Earlier research on host and risk area emergency evacuation operations (References 1 and 2), revealed both the lack of and need for coordination between host area, risk area, and regional public and private management personnel. During a field test at Jackson, Mississippi, a local official summed the meeting "the most important weakness of evacuation planning and operations is that no one is in charge." It was suggested that a middle management center (MMC) could coordinate the activities of each evacuation/reception area and function as a clearinghouse for intelligence and as a decisionmaking body for the allocation of evacuation area personnel and resources. One of the objectives of this research task was to refine the general concepts of earlier work to fit the statements of emergency evacuation management requirements.

Task 4: Conduct Field Tests. The objective of this task was to explore the research concepts and procedures for the middle management centers with government officials. Their responses served to validate and expand the materials. Interviews were conducted in FEMA Regions 4, 6, 9 and 10 with selected staff members and with representatives of state and local governments. Findings have been incorporated throughout this final report.



Task 5: Define Feasibility and Benefits of Centers.

The findings of the research and field tests were evaluated to validate the middle management center structure and to determine what modifications and additions were desirable. The purpose of this task was to demonstrate the means and degrees to which decentralized emergency management centers could improve present planning and operating concepts. This was accomplished by comparison of present with projected capabilities.

Task 6: Prepare Final Report. As noted, this Final

Report includes the research method, data, and findings. It incorporates the analytical and field interview findings to define the role of the decentralized federal/state emergency management centers to serve risk/host evacuation area and regional requirements. Finally, the report discusses the benefits and feasibility of an emergency evacuation management structure.

## 2. PRESENT EMERGENCY MANAGEMENT ENVIRONMENT

This section of the report reviews and summarizes past research data and findings relating to the analyses of middle management centers. It identifies pertinent and pervasive environmental factors for considering the feasibility and benefits of an emergency evacuation middle management structure.

### 2.1 DISASTER CHARACTERISTICS

It has become common practice to characterize disasters according to the expectation of warning to fit the two basic population protection strategies (inplace and evacuation). Disasters typically classified as occurring without warning include:

- Earthquake
- Fire
- Flash flood
- Explosion
- Hazardous material accident
- Transportation accident
- Terrorist action

Disasters that may be classified as preceded by warning include:

- Civil disorder/riot
- Epidemic
- Pollution episode
- Flood
- Tsunami
- Tornado
- Storm/hurricane
- Landslide
- Volcanic eruption
- Dam failure
- Nuclear war
- Nuclear materials accident (radiation)

Counter measures for disasters preceded by no or relatively short warning require pre-identification and designation of shelters, short response warning systems, and security maintenance. Flexibility is required to implement a remedial evacuation should damage, fire, toxic materials, or fallout prohibit maintaining the population in the shelter posture. Disasters without warning require long-term, passive protective stances, such as improved building standards, facility siting, and fire protection measures. Earthquakes are typical of this condition.

Disasters preceded by a relatively long warning period allow an evaluated response, with emphasis on warning.

public information, short-term mitigation, alerting emergency services and potential mutual aid providers, and decisions on in-place or evacuation countermeasures. In addition to adequate time to allow evacuation before the impact of the hazard, the warning must be sufficiently definitive to distinguish high-risk from low-risk geographical areas. Adequate detection, identification, and dissemination systems are assumed. These qualities do not necessarily accurately predict the severity or extent of the impact, duration, or secondary effects. (Typically, longer disaster warning times embody greater uncertainty.)

For the purposes of this study, a meaningful distinction between disasters is whether the inherent nature is such that it leads to a decision to take in-place shelter or to order emergency evacuation. For example, a tornado warning might allow time for population relocation, but the nature of the hazard precludes differentiation of high-risk from low-risk areas; hence, the feasible countermeasure is in-place protection. An incident involving hazardous materials, such as a train accident releasing chlorine gas, would typically occur without warning; however, the area subject to the contaminant could be identified, and there could be adequate time before the gas spread to achieve population evacuation. Another decision level is illustrated by earthquakes: disasters without warning. The initial damage, principally building collapse, causes secondary damage such as fire (as in the San Francisco case) or dam fractures (as in the Los Angeles Van Norman dam case). This secondary damage may be predictable and require remedial relocation.

All disasters have potentially catastrophic impacts on the immediate victims. For this study, concern is with the number of victims and the geographical extent relative to normal countermeasure capabilities. Moderate disasters are confined to one or several adjacent jurisdictions and local forces (supplemented by limited outside resources) can adequately mitigate the effects. Regional and nationwide disasters involve wider areas of effects (metropolitan areas, states and regions), and require significant levels of outside support.

Obviously, almost all disasters can be of greater or lesser impact, and can involve a period of uncertainty for emergency response systems. Disasters are destabilizing forces; any disaster combination may escalate in severity and area; most local disasters produce environments prone to related, secondary disasters; simultaneous disasters may vastly increase the cumulative hazard levels and areas.

The duration of the disaster is taken to mean not only the time of the hazard impact, but also the time for the

effects to subside to a sufficient degree to begin recovery and restoration operations. Mitigation operations may be conducted during the disaster impact period (e.g., levees may be reinforced during a flood). Moderate disasters are typically of relatively short duration (less than a week). Catastrophic disasters (regional earthquakes or nuclear war) may involve primary and secondary effects lasting for an indeterminable period. This would require a sustained emergency operations structure.

A final significant characteristic to distinguish between disasters is their frequency or recurrence, which allows emergency organizations to develop and gain experience with effects and countermeasures. Only with epidemics (in recent history), nuclear fallout, and nuclear war crisis relocation is experience unavailable at the national level. Terrorist actions involving nuclear weapons are a potential, imminent threat (Reference 6). However, by the nature of the subject, most local officials have limited experience with most types of disasters.

By their nature, catastrophic disasters with warning times adequate to allow population evacuation involve uncertainties that may be so great as to preclude reliable local evaluation and decisions. For example, hurricane warnings involve long-range weather prediction and storm-tracking activities. Nuclear crisis relocation involves judgements of enemy intentions, capability, and timing. Though strategic war is presently classified as with warning, the possibility of a preemptive strike without warning remains. The costs of disruptions resulting from nationwide evacuation are considered so high that it could be initiated only by presidential directive, with the concurrence of state governors.

Thus, disasters that are likely to result in large-scale emergency evacuation require both technical warning systems and organizations sensitive enough to predict the event, and response systems to react to the prediction, make judgements, and issue directives. For disasters caused by human actions (terrorist attacks, civil disorders, and war), the opportunity to warn the public is subject to the tactics of the instigators and the strategy of the defenders. The later analyses of emergency evacuation management centers must be influenced by possible or actual uncertainties facing operating officials at all government levels during the crisis phase. As a general rule, it is apparent that the greater the uncertainties, the greater the need for effective top-level decisions for resource allocation and the disposition of contingent units in flexible reserve positions. In other words, organizations should not commit all their resources until the full impact of the disaster is clear.

## 2.2 OBJECTIVES AND PLANS

The FEMA program is to assist state and local governments to improve their readiness for life-saving operations and mitigation of damage resulting from natural and manmade disasters and nuclear attack. FEMA has two basic strategies for protecting populations threatened by major hazards. One is to provide the best protection possible with the population "inplace" at or near their homes, schools and places of work if the warning time is short. The second is for people to leave the threatened area if time allows. The latter involves the orderly evacuation of people from high-risk areas (areas likely to be directly affected by hazards) to low-risk host areas (and their reception, care and protection in the host areas).

The federal government has developed Federal Regional Centers within each of its regions. Some of these are in underground facilities, designed to withstand substantial hazard effects and equipped to maintain independent operations over an extended period of time. Their function is to coordinate state and federal activities for survival and subsequent recovery (e.g., receive and transmit warnings, predict hazards, prepare situation reports). They also serve as communications links with state governments and central federal facilities.

Coordinated operations are also required by states and local jurisdictions. The federal government has promoted state and local Emergency Operating Centers (EOCs) by providing financial assistance (matching funds) for development and construction costs. Primary justification for these facilities is for use in the event of nuclear attack, although state and local governments often use them during peacetime emergencies such as hurricanes, large-scale fires, and floods. The federal government has also funded the RADEF program, and contributed to other equipment and operations costs.

Though it is generally accepted that all state and local jurisdictions should be capable of conducting coordinated operations during major emergencies, it is also generally accepted that most local jurisdictions have limited capabilities to prepare special countermeasures for all contingencies. Some elements of emergency responses are susceptible to basic plans and operations, which should encompass all essential forces and resources available to the jurisdiction. These elements should be incorporated into a single emergency operating doctrine for planning economy and efficiency, to achieve standard and effective operation and coordination procedures, and to allow simple and unambiguous communications between the many individuals

and organizations affected. Thus, a basic emergency operations plan should define the local emergency organization and responsibilities. It should cover required system functions, such as the capability for direction and control by key officials and their staffs, communications, and secure facilities. The ability to warn and to provide emergency information and advice to the public should be included. The plan should also cover in-place and emergency evacuation operations, defining the responsibilities of essential organizations.

In addition to basic emergency plans and operating centers, local emergency plans should deal with the various types of emergencies the locality may experience. Risk area operations are obviously different between the in-place and evacuation countermeasures. Evacuation also requires different host area responses. The problems associated with doubling or quadrupling the host area population may strain the area's ability to provide in-place shelter, and may involve different control and resource allocation strategies.

It is apparent that plans for both in-place protection and emergency relocation contain elements and characteristics that are applicable to conditions resulting from both natural disasters and military emergencies. For example, in-place protection is needed for natural disasters with short warning periods, such as tornados or flash floods, as well as for the effects of nuclear attack. Evacuation is applicable in areas threatened by hurricanes or floods, as well as during a developing nuclear crisis.

Other characteristics differentiate wartime disasters from natural emergencies. Natural disasters are usually site-specific: they involve a single contiguous area rather than the entire nation. In many cases, the intensity of natural hazards is limited, or at least can be estimated with relatively high confidence. Likewise, the duration of the emergency can usually be estimated. In the nuclear attack situation, risk areas are distributed nationwide and are subject to potentially catastrophic effects. Residual radiation may require fallout shelters in both host and risk areas. Nuclear crisis conditions may be of indeterminate duration, and may be resolved without actual nuclear exchange.

### 2.3 PRESENT EMERGENCY ORGANIZATIONS

The roots of present civil emergency management organizations at federal government level were established by Congress in the Federal Civil Defense Act of 1950 (50USC App. 2251-2297) as amended.

"It is a policy and intent of Congress to provide a system of civil defense for the protection of life and property in the United States from attack." (Reference 7)

The Act further states that civil defense is a joint responsibility of federal and state government (and, by extension, of local government). Subsequent amendments and executive orders have expanded the federal charter to include natural and man-made disasters. At present, many federal authorities and responsibilities are vested in the Federal Emergency Management Agency (FEMA). Other federal activities are assigned to "delegate agencies": e.g. the Department of Transportation is responsible for land, water and air transportation and storage facilities; the Department of Agriculture for food production, procurement and distribution.

A long history of traditional and legal practices underlies the present structure of emergency organizations in the United States. Local fire, law enforcement and health agencies are structured to deal with moderate disasters at the local jurisdictional levels. Military bases and federal agencies have traditionally supported adjacent civil populations. (A local Army commander or the head of a federal field agency in general has the delegated authority, in an emergency, to commit his federal resources without first consulting higher authority. Alternatively, the commitment [or withdrawal] of his resources can be made by his national headquarters [Reference 8].) National guard units, normally under state control, are often used for disaster mitigation, control, and relief, and to provide personal and property security. The prestige and financial resources of federal organizations have had significant impact on the policies and procedures of local organizations.

The American Red Cross has a special congressional charter directing it "to carry on a system of national and international relief in times of peace and to apply the same in mitigating the suffering caused by pestilence, famine, fire, flood, and other great national calamities." Its disaster services staff is frequently dispatched to a disaster scene to provide administrative and supervisory personnel to assist local chapters. In large operations, national personnel often supplement local personnel. Other

religious, welfare, and private organizations also provide significant relief and assistance. In many communities, churches and the Salvation Army have a quasi-official relationship with the police and fire departments, and as a matter of routine provide many types of help.

State police and highway maintenance departments are often responsible for disaster assistance. Many have extensive plans, resources and experience for dealing with disaster hazards, including radiation detection and monitoring, and mitigating damage. Local emergency organizations, particularly fire and police services, provide for support by mutual aid compacts. Many large private organizations (especially public utility companies) have extensive operational capabilities to deal with disaster effects. Some large industrial facilities have extensive security and fire resources. Many have significant relocation plans and alternative headquarter facilities.

The emphasis of the federal emergency management program has been to assist state and local government -- financially, technically, and administratively -- to protect their residents from the dangers of nuclear war and radioactive fallout. Components of a nationwide system have been developed, including warning and communication networks, radiological monitoring capabilities, and state and local ECC's. The present effectiveness of the components is varied and difficult to measure. During the early 1970's, the concept developed that a nuclear attack would very likely be preceded by a period of international tension or crisis, providing time for emergency evacuation. This concept led to an extensive crisis relocation planning program.

Many states have adopted legislation giving broad emergency powers to state government and setting up emergency response procedures for both war and peacetime disasters. All states and most communities have some form of emergency preparedness organization to direct or coordinate disaster activities. The state organizations are often associated with national guard units.

Superimposed on these traditional, general-purpose disaster organizations are federal and state agencies and commissions created to deal with specific disaster hazards. As noted, several of the federal disaster oriented agencies have been incorporated into the FEMA organization. Organizations have also been created at state levels; for example, the California Seismic Safety Commission to deal with earthquake disasters. The present organizations have attributes and legal precedents that have been demonstrated to be feasible and effective.



Over 25 years ago Dr. Charles Fairman of the Harvard Law School noted that "...a striking characteristic of civil defense is that it is a matter of coordinating other departments. It is not a great substantive thing in itself -- it is not like Foreign Affairs or Agriculture or Treasury; civil defense is concerned with the continued functioning of other parts of Government, and the problem essentially is to effect a coordination of all the existing agencies" (as quoted in Reference 9). The statement and the problem are valid today as one seeks to evaluate emergency management roles for FEMA.

A second pervasive observation is that federal civil defense is defined to be passive defense, differentiated from military active defense (and offense). This definition has led to widely held views concerning the appropriate roles for FEMA. (1) FEMA's role is to advise and assist the President in the coordination of emergency activities among the federal agencies (because the head of one agency cannot logically direct the head of another agency). (2) FEMA's emergency role is to evaluate the disaster situation and recommend where support by federal resource agencies should be provided. (3) FEMA has little operational capability (it commands minimal resources and operational forces), hence it has no substantive operations mission. (4) Only in its planning and increased readiness functions is there a semblance of a command and control function -- disguised as "recommendations" to states, because FEMA has no legal pre-disaster authority over the states. Thus, the pre-disaster views of FEMA operations are widely held to be confined to financial assistance, information processing, agency coordination and contingency planning.

In many situations this view of FEMA's roles extends to the federal regions and to state emergency operations agencies. A common point expressed by many state and local officials during field interviews is that local officials do not trust federal or state officials to control emergency operations -- "They would rather go it alone." This pre-disaster attitude is in sharp distinction with analyses of actual disaster operations (Three Mile Island, Mississauga, and Mt. St. Helens) which involved actual or potential evacuations. In each case, federal and state agencies (including FEMA) were quickly and directly involved in local operations. In each case, the technical expertise and operating capabilities of regional organizations were vital to local decisions and operations. In each case, officials at all levels found appropriate roles and means of support and coordination despite deficiencies in planning and preparedness.

Federal support included technical knowledge and coordination, environmental monitoring, coordination of all emergency-support agencies, search and rescue operations, communications and public information. There were also the economic support activities of the federal agencies. (Local officials consider the one-stop center approach used in major disaster situations to work well.) The effectiveness of the many organizations involved in these disaster events was varied and difficult to measure. There were many criticisms and short-comings cited. It appears that a pre-planned emergency management structure would prove more effective than a spontaneous response structure.

The present emergency management system may be characterized briefly as follows:

- Federal, state and local governments share emergency responsibilities.
- Many public and private organizations at all levels of operation have traditional and legal emergency roles. These organizations direct and control local operations that do the actual work.
- Local jurisdictions have basic responsibility for handling moderate disasters within their areas, and normally function effectively with little outside assistance.
- Should the disaster extend beyond a local jurisdiction, or should it become of greater magnitude than the local officials can handle, the state becomes involved by coordinating and providing resources. Should the disaster reach proportions that overwhelm local government, the state may assume operating responsibility.
- The federal government normally acts in a coordinative and supportive role. For disasters of catastrophic impact and very wide extent, the federal government might assume control, although this possibility is considered remote. Some system of shared responsibilities is considered more likely.
- The federal government does not have an extant centralized emergency civil operations management capability. Its authorities and responsibilities are distributed among many agencies. Response to state and local emergency needs is typically provided by local military commanders and the heads of federal field agencies on a decentralized basis.

#### 2.4 ENVIRONMENT FOR FEDERAL/STATE MANAGEMENT CENTERS

Sections 2.1 through 2.3 have briefly reviewed present disaster hazards, countermeasure objectives, and emergency organizations. These analyses serve the research effort by defining the environment for federal/state level emergency evacuation management centers. Significant elements of the environment may be characterized:

- Present, established graduated disaster response systems have worked adequately in the past. Therefore, only considerations of more severe hazards -- "catastrophic disasters" -- can justify the need for a more effective response system.
- Relevant characteristics of catastrophic disasters include severe hazards to large numbers of victims over wide geographical areas; primary and secondary effects lasting long enough so that emergency operations may have to be sustained indefinitely; potential, but uncertain, warning to allow identification of hazard areas; and infrequency to preclude extensive experience with their effect and countermeasures. Possible catastrophic disasters include nuclear warfare, nuclear materials accidents, hurricanes, earthquakes (secondary effects), and the cumulative effects of lesser disasters. Short of an actual attack, nuclear war crisis relocation is the most severe condition because it affects the entire nation simultaneously.
- Recognition and acceptance is needed at all levels of government and industry of requirements for coordinated responses to catastrophic disasters, including the need for pre-disaster organization planning and training.
- Thus, a prerequisite to establishing more effective state/federal middle management centers is modification from the present attitudes (and legal authorities) of a passive advisory role to an active central management role for federal civil emergency operations (FEMA).

### 3. EMERGENCY EVACUATION ACTIVITIES

#### 3.1 CONCEPT OF OPERATIONS

This report section deals with the emergency evacuation activities of federal, state and private regional organizations to support local activities. The data are summarized from FEMA crisis relocation guidance materials (References 3 and 4) and from earlier research studies (References 1 and 2). The earlier research studies were directed to the emergency evacuation management requirements of host and risk area organizations. That research extended to higher level management because it became evident that some catastrophic disasters, causing emergency evacuation of large populations for extended time periods, could impose requirements beyond local capabilities. A primary characteristic of these organizations is that they embody top-level decisionmaking and control functions, distinguished from local organizations that embody operating functions and capabilities.

The intent of this chapter is to specify the essential decisionmaking activities likely to revert to federal/state levels because of the catastrophic effects. For many activities, the decisionmaking roles of federal, state and private organizations will be distinguished by pre-disaster jurisdictions, operations, resources and legal/traditional responsibilities. Relationships of interacting organizations will vary between areas of the country. For other activities, the decisionmaking roles will be distinguished by the severity and extent of the disaster, and perceived levels of stress and criticality. In emergency situations, any of the many organizations might extend its individual authority, depending on the specific crisis requirements. This latter condition will be explored at greater length in Section 5.3.

The primary mission of federal/state level organizations in emergency evacuation is to support the activities of local jurisdictions to provide for the needs and protection of the population. These organizations may conduct two kinds of crisis operations: First, their forces may be employed in direct support of local operations (i.e., units or individuals assigned from their own forces

to augment local forces); second, they can assure local availability of essential goods and services by controlling and expediting production, distribution, and use within the limits of what is available. This requires coordination of the activities of public and private organizations, whose combined efforts are required to transfer available resources to those who need them.

### 3.2 DIRECTION AND CONTROL

The ability to function during emergency evacuation conditions is an obvious primary requirement for all essential organizations. Key personnel must maintain overall control of operations. They will require secure facilities, communications and adequate logistical support.

Warning is an initial activity of federal/state organizations. They must identify hazards, determine potential disaster effects, evaluate alternative countermeasures, select courses of action, and promulgate decisions. For disasters that strike without warning, these actions are based on surveys of damage. For disasters that are preceded by warning, the actions are based on detection systems and disaster indicators. Typically these detection, evaluation and dissemination systems are under the direct control of federal/state level organizations. When the federal/state organization decides to implement protective measures -- evacuation or in-place protection -- the countermeasure itself is likely to disrupt normal activities. The nuclear crisis relocation emergency is an extreme example of a countermeasure, designed in part to preclude the attack, which involves such extensive disruptions that it would constitute a disaster only less extreme than war itself. Thus, though limited responses may be decided at local levels, major responses to extensive disaster threats are a primary responsibility of top-level decisionmakers.

To effectively accomplish these activities, federal/state level organizations should establish systems:

1. To acquire, evaluate and interpret state and national hazard data.
2. For host and risk area surveillance and reporting.
3. For radiological monitoring and reporting.
4. To train intelligence and radiological personnel.
5. To prepare damage assessment reports.

6. For procedures and means to disseminate data.
7. To report between federal/state level organizations.

Communications are required for all essential operations so that local assessments and requirements can be passed up, and decisions and directives can be passed down. Information must also be passed laterally among the various organizations who must cooperate or whose activities must be coordinated. The need for coordinated, rapid action inherent in an emergency evacuation situation makes communication support crucial. (The delivery of written messages by messenger services is slow and inefficient. The postal service is expected to be in limited operations, if at all.)

There are extensive telecommunication networks and equipment to meet the normal needs of government, industry, and the public. Three kinds of operations should be considered: first, transmission of information within the federal/state organizations, between the federal/state and local governments, and among local governments. The second is for transmission of information within and between essential industrial activities. The third is for informing the public by both federal/state and local governments. Federal/state level support operations should include actions to interconnect the systems and to provide a central control point for the integrated network. Federal/state organizations should:

1. Coordinate private and public systems.
2. Establish links with critical organizations and centers.
3. Establish controls and procedures.
4. Devise means and implement augmented communications.
5. Coordinate in-coming communication resources, particularly radio.
6. Provide logistical support.
7. Ensure information relay capabilities.
8. Coordinate use of mobile communications.

Emergency public information refers to those instructions and guidance that would be disseminated through the mass media and organization channels at or very

near the time emergency evacuation is directed. (Clearly, it would be beneficial to have communicated general information regarding the relocation prior to the emergency.) Emergency information must be transmitted to the public so that it can be advised of the general situation and of what should be done to withstand the hazard effects. In addition, the public needs to be reassured that appropriate measures are being taken, and needs to be motivated to do what is expected of them. At the federal/state level, it is particularly important that the President, the governors, and other public officials be able to speak directly to the public. Therefore, TV and radio networks should be available (as the EBS network).

At present, basic contingency plans cover many types and levels of disasters and include inplace protection as well as emergency evacuation. Many people find it difficult to think about contingencies and alternate plans, especially when the alternatives are not a matter of local or personal choice but a matter of higher-level decision. Communication of civil defense information is complex, and must be handled both candidly and with great care. Basic emergency evacuation instructions on when to start, where to go, and what to do will make sense to the recipients only if it is compatible with their other personal concerns and with general reports on the hazards on television, radio and in the newspapers. Thus local instructions must be coordinated with national pronouncements. Federal/state activities should be based on the following criteria:

#### Media Selection

1. Select for coverage, appropriateness, and redundancy.
2. Select for ease of access and cooperation.
3. Resolve "freedom of press" versus least confusion media.
4. Minimize number of channels.
5. Designate one local radio station for automobiles.
6. Serve non-English speaking groups.
7. Match media with message content.
8. Ensure capability to provide attack warning.
9. Include EMP protection in selection criteria.

### Message Content

1. Promulgate state and federal instructions.
2. Rationalize national news to local conditions.
3. Deflate rumors.
4. Communicate special instructions to selected organization personnel.
5. Distinguish between in-place and relocation actions.
6. Communicate "stay-puts."

Economic and financial dislocations would result from the relocation of urban populations. Though many persons would continue to perform their normal jobs and others would work at emergency tasks, many normally employed persons would find themselves without their usual source of income. Similarly, many businesses and industries, both in risk areas and in host areas, would be unable to operate. Continuing to pay salaries and wages would be impractical for many businesses and governmental organizations. The preparation of payroll vouchers, normal banking facilities, and mail delivery would be curtailed.

Economic and financial controls and procedures are fraught with uncertainties for local officials. Procedures for accounting and paying for resources and supplies are expected to be defined by higher-level directives. It can be assumed that no one will be denied the essentials for lack of money, and that the expenses incurred by businesses, governments and other institutions preparing for and implementing evacuation will be financially redressed through a variety of federal actions. (While no policy has been enunciated, it is believed that in the real case any federal proclamation requiring evacuation would also address such topics as fiscal liability/responsibility, public use of private assets, and use of government employees outside of their home jurisdiction.) However, it is unlikely that specific state and federal policies will be announced prior to evacuation, so local officials may be required to conduct initial operations according to their own judgements.

Extensive discussions of financial considerations during the field contacts pointed out that this guidance is inadequate. (This had been anticipated by the FEMA and research personnel, but more specific guidance is unavailable.) Local officials would like specific instructions on where to go for what support. Timing is



critical. Counties have limited sources of funds which they would use first, then they would turn to state and federal sources. Local officials feel the outcome of this is uncertain, and legislation (both state and federal) is needed. They are more confident of financial support by federal and state sources for very major disasters (earthquake or war) than for more limited events.

Local officials repeatedly emphasized the need for federal or state anticipatory funding for equipment, supplies, and radiological protection before the evacuation. Financial support during emergency evacuation may be assumed, but the necessary procedures and authorities are often either unknown or misunderstood by local officials. They expect long lead times when ordering and installing materials and equipment. Emergency communications are generally cited as most critical and also inadequate. Local officials consider organization and implementation to depend on firm contracts, which require firm funding.

### 3.3 POPULATION MOVEMENT, RECEPTION AND CARE

Movement of risk area relocatees to the host area will rely on private automobiles as the major transportation mode. Buses will be an important secondary mode, particularly for those segments of the population without their own transportation. Trains, airplanes, and waterborne vessels will be used for special applications.

Routes out from the risk areas will be controlled by risk area personnel, as will the utilization of the secondary modes of transportation. Control of movement on the major interstate and state highways will be accomplished by the state highway patrol forces. The host county highway patrol (sheriff's units) will cooperate with state highway patrol forces to provide services at rest stops and refueling points, and to clear highway accidents. County police and highway department personnel will also play a major role in controlling the egress of the relocatees from the major arterials to the host areas. Host communities will be required to assume control of the relocatees on entrance to the jurisdiction; they will be responsible for the routing to the reception centers and for subsequent control.

Reception and care of the relocatees will be the primary host area activity. The ability to house and feed the relocatees is the basic consideration to the feasibility of the emergency evacuation operation. Civil defense policy in nuclear crisis relocation is to house the

relocatees in public congregate care facilities (e.g., schools, churches, hotels, motels), rather than in private residences. This approach anticipates the most severe reception and care burden for host area officials. It ignores the experience and research, which indicates that a large portion of the relocatee population would move to private homes of relatives or friends, and that many host area families would be willing to share their homes. It is apparent that all host area operations would benefit from the maximum use of private residences for reception and care. An initial function of all government officials should be to encourage and facilitate this course.

For those relocatees who do not move directly to private residences, the principal requirements for reception and care are to:

- Receive and register the evacuees;
- Provide housing in congregate-care facilities;
- Feed the relocated population;
- Provide necessary services and facilities for the aged, infirm and other populations needing special support.

In addition, host area officials will need to:

- Provide other essential services to the relocatee population, such as medical care, police and fire support, and public utilities;
- Provide shelter for the relocatee and resident populations should there be a fallout hazard.

The civil defense guides for crisis relocation contingency planning and their backup documentation specify methods and organizational structures to accomplish the reception and care functions. Extensive surveys of congregate-care facilities and fallout shelters are being conducted along with the federally-supported crisis relocation planning. In addition, many local areas have community shelter plans (for in-place shelter) and various locally derived emergency plans based on their vulnerability to natural hazards. Even with minimal prior planning and short warning, analyses of past responses to natural disasters lead to the conclusion that most host areas could rapidly designate congregate care facilities and feeding establishments. Should the emergency be prolonged, it is expected that these designations could rapidly be improved to adjust to the relocatee load.

The manpower requirements for organization and staffing for reception and care are extensive and, except in most general terms, have few counterparts in our society. At the same time, limited specialized technical knowledge is required. The typical recommendation is that the staff be drawn from personnel of the school systems and welfare agencies. There are a relatively few professional Red Cross and state personnel with extensive training and experience who are commonly employed during natural disasters of moderate intensity. For a major natural disaster or nuclear crisis relocation, the host areas would have to operate on an ad hoc, self-help and self-training basis, as envisaged by the referenced Emergency Evacuation Guide (Reference 5). Additional manpower could be recruited from the relocatees. Even in areas with extensive emergency evacuation planning, it is unlikely that a trained, designated organization could be maintained to provide for reception and care. This does not appear to be an acute problem for host area officials, even during the movement phase of the relocation. They can expect the vast majority of the relocatees to be cooperative and self-organized. Should the evacuation be prolonged, problems may emerge with militant or criminal groups requiring special treatment or police control. It is likely that outside authorities should be called on to deal with these groups, because host area capacities will be saturated with other problems, and because state and risk area forces will have had more experience with these types of problems.

Federal/state level organizations have recognized the pre-disaster needs to initiate, coordinate and support planning for the movement, reception and care activities of both risk and host areas. Only at this overview level can equitable and feasible allocations be made. (Moreover, it is difficult for local risk area officials to voluntarily plan to evacuate their constituents, and for local host area officials to voluntarily plan to assume the burdens of providing for the relocatees.) Once the movement commences, the activities of the higher level organizations are limited by their capabilities. State police and highway personnel can control arterial traffic; except in wartime, national guard and federal military personnel can supplement local forces; federal agencies (DOT and FCC) can make limited allocations of transport and communications facilities. However, in the main the activities of federal/state level organizations will be the surveillance of local operations; the coordination of communications to facilitate the movement; and the technical expertise to deal with specialized problems which develop during the evacuation. The highest priorities for these organizations during the movement, reception and care period of the disaster will be to establish themselves in secure

headquarters, to maintain their integrity, and to prepare to coordinate and support operation under evacuation conditions.

#### 3.4 SHELTER AND RADEF

Although the purpose of emergency evacuation is to remove populations from hazardous areas, a nuclear war could result in radiological fallout over such extensive areas that avoidance would be infeasible. Therefore, emergency evacuation planning involves the identification of fallout shelters in host areas. The general rule is to use the best shelter available. Many congregate care facilities will not have adequate shelter protection, so host officials may be required to try to upgrade the structures to increase protection or accomplish a second movement operation for the evacuees. Shelter facilities must also be managed and stocked with survival supplies -- food, drugs, sanitation equipment, etc., placing additional demands on already scarce resources. These problems are further complicated because the host community may have different in-place plans to shelter its indigenous population in case of an emergency without warning.

Faced with a potential radiological fallout hazard, each community would have strong incentives to upgrade shelter protection to the maximum extent possible. Normal construction activities in host areas will generally cease at the time of relocation, so personnel, equipment and supplies could be diverted to upgrading fallout shelters. Technical studies have demonstrated that significant increases in protection can be accomplished by adding cover or providing ventilation to existing structures. Other research has yielded little confidence that these are feasible operations to be achieved by host area officials, especially for relocatees in public facilities. Except for those resources already in the host areas and under the control of local organizations, it is expected that construction capabilities will be allocated and coordinated by federal/state officials.

RADEF training and support was a major element of earlier civil defense programs. Interviews with local officials indicate that local RADEF capabilities have declined over the past decade and are inadequate. It is considered that the public really doesn't understand the hazard. For example, in Mississippi a rural police chief could not understand why he wasn't provided "protective clothing" for his personnel. Also in Mississippi they have the planning problem for the Grand Gulf nuclear power plant. In California, the State Highway Patrol has trained

personnel and instruments (at weighing stations), but these are limited to "a truck turning over somewhere." The dispatcher has a checklist on what to do. The Public Health Department has responsibility for radiation problems.

Many local public safety officials consider RADEF an acute problem. They typically assume that technical personnel, supplies and equipment are the responsibility of federal/state level government organizations.

Higher level decisions for shelter and RADEF activities might include:

1. Upgrading RADEF capabilities at all levels.
2. Re-evaluation of survey data and allocation plans.
3. Redistribution of evacuees to best available shelters.
4. Inspections to update and revise survey data.
5. Engineering evaluations of new and upgradable shelters (incorporating blast protection if possible).
6. Area-wide determination of optimum manpower and resource allocations and priorities between local areas.
7. Consideration of space not in CSP Plans, and minimum space requirements.
8. Development of regional and local command structure (Corps of Engineers and local public works engineers).
9. Selection of facilities and sites for construction.
10. Engineering designs and specifications.
11. Utilization of large contractors to manage and supervise activities.
12. Advice, support and resource allocations for "do-it-yourselfers."
13. Plans for finance and accountability.

### 3.5 PUBLIC SAFETY, MEDICAL AND HEALTH

For law enforcement, fire and medical support, federal/state and private organizations have limited facilities and personnel under direct control. They must determine during which time phases of the evacuation these are used in committed or contingent roles to support local area operations. Some supplies and equipment may need to be allocated at the central level. To a limited degree, the federal/state level can control licensing and relax regulations and procedures. As discussed in Section 2.3, the considerable personnel, resources and organization of military and national guard units may be available.

Public safety requirements in the risk areas will probably increase during the movement phase and then reduce substantially during the maintenance phase. Force levels will depend on factors unique to each risk area: the number and size of essential operations, the number of stay-puts, and the judgement of the risk areas public safety officials. The major increase in the population of the host communities will result in greater law enforcement requirements, and in special problems for fire protection forces. Providing additional public safety capability to host area communities is a difficult and controversial issue that must be resolved at the local level because of differences in the operational, legal and political requirements of host and risk area jurisdictions; local problems resulting from the composition of the populations; the nature of the hazards; and past relations between the jurisdictions.

Law enforcement activities can be characterized as follows:

1. Traffic control;
2. Property and personal security;
3. Protection of essential industrial sites.
4. Criminal investigation; and
5. Maintenance of detention facilities.

In each of these categories, many of the routine police activities can be deferred or reduced in scope for the emergency period: issuing traffic citations, serving warrants, investigating accidents, training, etc. For traffic control, local law enforcement forces will have primary responsibility for internal area movements and for flow from the risk to the host areas. Uniformed officers

will be particularly effective for highway patrol, traffic control points, and rest areas. Auxiliary personnel may be used for local traffic direction.

During the movement phase, major operations will include expediting the flow of traffic, detecting and correcting traffic problems, and assisting at the scene of automobile accidents. The movement of priority traffic and the enforcement of traffic restrictions will also be primary responsibilities. The law enforcement forces will monitor movement operations, provide status information to other officials, and provide security for essential organizations and key individuals.

The extent of risk area law enforcement operations during the maintenance phase will depend in part on the number of stay-puts. House-to-house enforcement of relocation is deemed neither possible nor warranted. The law enforcement agencies will be responsible for implementing public policies, such as curfews and restrictions on the distribution of food, fuel and other resources. The police will also be responsible for security of private property from burglary and looting. Sensitive retail establishments such as food, drug, liquor, and jewelry stores will require special surveillance.

Augmented security forces will be required in host areas for neighborhood patrols, for security of food and other essential resources, and for the relocatees' parking areas. They will also be required for each of the congregate care facilities. It is assumed that much of this workload could be borne by auxiliary personnel.

Despite preventive measures, incidents of crime will undoubtedly rise in the host areas. This will be the responsibility of the host area county and city police forces. Should they be saturated, they could be augmented by appropriate task forces from the risk area jurisdictions. It is difficult to determine in advance the increase in the workload in detention facilities. The disposition of risk area prisoners should be the responsibility of risk area officials in cooperation with host area officials.

Fire protection and rescue operations during emergency relocation are generally the same as those performed in normal operations:

1. Fire prevention;
2. Fire suppression;
3. Rescue; and

#### 4. Mobile medical services.

During the movement phase, fire services will concentrate on detecting and suppressing fires. Fire incidents may increase because of the rapid vacating of residences without adequate personal safety precautions. In addition, risk area fire services may be called on to support police forces in rescue operations, medical support, and the suppression of vehicle fires.

The character of fires in the risk area will probably change after evacuation. With population evacuation, people-initiated fires should be substantially reduced. However, people also provide an early detection system for fires, so those fires that do occur can be expected to be more severe, requiring larger response teams that will often concentrate on protecting exposure and knockdown techniques rather than the usual efforts to save the structure itself.

Host community fire prevention activities will be increased substantially due to the increase in population and the conversion of non-residential buildings to lodging facilities. Initial and continuing inspections should be made to identify and correct hazardous fire safety conditions. At the same time, the relocatees should be instructed in fire safety techniques and educated on what to do in case of a fire. It is difficult to judge the anticipated higher incidents of fire, since there are no generally accepted standards for the congregate care situation. Thus, the final determination on increased requirements must be made by the local fire service agency. Much of the workload should be met with auxiliaries.

Both police and fire forces will be required to support essential industry operations. Auxiliaries and trained volunteers may be suitable for security functions at less sensitive facilities and as the second member of two-member teams. Public safety forces will also be required at the access control points. These may serve as intermediate redeployment bases for equipment and supplies, as well as rendezvous points for commuting public safety personnel.

In some areas, the dispersion of risk area public safety forces to act as fillers for host area forces would present organizational and control difficulties, weaken the integrity of risk area forces, and involve frustrating allocation problems. It is likely that in many areas, the host jurisdictions can establish adequate public safety support with the augmentation of local auxiliary personnel. The commitment of the sworn peace officer or the trained



fire fighter is often unnecessary. For many operations, local public safety officials should view their forces as a leadership cadre; many actions could be implemented by auxiliaries. State and risk area public safety forces could be used as contingent reserve units, in the mutual aid context, to efficiently respond to special host community emergencies.

Providing medical support during emergency relocation presents substantial problems for host area officials. Many host counties are deficient in health care resources compared to urban risk areas, even for their indigenous population. The concentration of large numbers of relocatees in congregate care structures not intended for housing, crowding, limited sanitation facilities, and mass feeding all indicate a likely increase in the incidence of disease. Moreover, the relocatees are separated from their normal sources of health care and medical supplies. Accidents and stress conditions leading to heart attacks and nervous disorders are likely to be more frequent. Host area medical support involves three types of operations:

- Movement phase emergencies;
- Current patient load of the chronically ill and aged; and
- Health services for the "normal" population.

During evacuations of relatively short duration, short warning time and local extent, the normal practice is to use the emergency facilities of hospitals and medical staff in contiguous areas. For longer duration emergencies, physicians and nurses relocate to the host areas, and are assigned to medical facilities there. The loss of efficiency resulting from the relocation should be compensated for by deferring non-critical treatment.

During the movement phase, the major risk area medical operations will be devoted to providing host area medical support and to the relocation of institutionalized patients and handicapped persons. Some emergency medical support will be required in the risk areas to provide health care for non-transportable patients. It is probable that hospital resident physicians, nurses, and employees of the risk area health agencies will assume responsibility for these medical operations. This will free medical personnel in private practice to relocate to the host areas.

Mobile medical aid to serve vehicle accidents and other emergencies is normally the responsibility of private ambulance companies or the fire and rescue service,

although law enforcement agencies may be responsible in some counties. Provision should be made to move some ambulances and medical support to the rest areas to care for emergencies. Movement phase emergencies close to risk areas could be handled by mobile units from the risk area, temporarily utilizing the emergency facilities of risk area hospitals.

During the maintenance phase, most medical activity will be conducted in the host areas by the relocated medical and support personnel. It appears desirable for at least one major risk area hospital to be kept operational for the care of intensive care and cardiac care unit patients. Some medical support will be required at the staging areas and at the access control points. These medical personnel and mobile medical support units could be supported by the central hospital. Medical staff for risk area operations, as during the evacuation phase, could be provided by the resident hospital staff and public health officials.

At any particular time, it is estimated that an average of about one percent of the population are receiving medical care as patients, residents or inmates of hospitals, convalescent homes, or other institutions of specialized care. Considerably more are under medical treatment in households. It is expected that host area officials will accomplish last-minute arrangements for the use of appropriate facilities to care for the specific needs of the chronically ill, aged, or other patients.

For the "normal" patient load, it may be expected that physicians and other medical professionals would be located at host area treatment facilities and the patients brought to them. It is also important, however, that surveillance be established in the congregate care facilities with appropriate medical personnel on the scene. Host county residents would continue medical services by their usual practitioners.

Public health measures include analyses of potable water supplies, sewer treatment effluents, inspection of mass feeding facilities, collection and disposal of trash and garbage, and vector control. Host area health staff may be augmented by risk area and state personnel to assist in these measures.

Public health support in the risk area should be minimized by the relocation of the population. Surplus personnel could be assigned to the host areas for the analysis of potable water and sewage treatment, and for the inspection of lodging and mass eating facilities. The need for trash and garbage collection in risk areas will also be

minimal. As with other public health support units, these can be relocated to the host areas in accordance with the redistribution of the population. It is desirable that they move with their organizational personnel and equipment assigned as operating units.

Federal/state organization employees and organizations will be deployed during emergency evacuations to conduct federal/state emergency operations (typically in their own facilities). To assist local governments, operational support can only be supplied from those federal, state and private organizations that have substantial operational capabilities: for example, the state police or highway patrol, or the state highway department. Support by the state highway patrol would first be needed to assist in traffic control during the evacuation movement, probably on state and federal highways. The need for this original commitment would diminish when the major evacuation movement was complete. At that time, the units might be committed to a second activity (for example, to control through traffic on the main resource distribution routes). Or units could be withdrawn to a reserve status for later contingencies. Support by state highway department units would be needed when the unusual traffic patterns resulting from the relocation caused damage to essential roadways. Similar considerations would apply to the assignment of other federal/state organizations and employees. Direct support could also be provided by one locality to another, but to accomplish this effectively, some coordination will be needed to assign surplus capacity. This is a federal/state activity in an emergency evacuation situation, because of the need to efficiently allocate resources.

Along with hospitals remaining in operation in risk areas, some state and federal medical facilities will operate as separate institutions or as part of other institutions. These should be assigned direct roles to local jurisdictions either on a committed or contingent support basis.

### 3.6 RESOURCES AND SUPPLIES

The relocation of population during an emergency evacuation would alter the geographical pattern of production and supply, and of the demands for goods and services. It would also alter the extent of demand, because the supply of goods and services would be restricted to those essential for survival. For the most part, these essential goods and services would be supplied by private companies that have developed organizational and

operational arrangements -- both internal and intercompany -- that operate efficiently to meet the normal demand patterns. The changes imposed by emergency evacuation would require rapid adjustment of the production/distribution system so it is unlikely that an alternative or substitute organizational arrangement could be constructed quickly that would operate as effectively.

Officials of existing essential industries and services will require two types of information. First, they must know what essential goods are to be supplied. Second, they must know the extent of the redistribution of people and the nature of their demands. This information should come from federal/state organizations because only they have the resources and authority to develop the information. In addition, quantities and recipients must be specified (i.e., who gets how much of what). This involves not only the allocation of end items for consumption, but also goods and services required for production and distribution. Again, this is a federal/state level activity because only they have the authority to establish such allocation systems.

The operations necessary to accomplish these activities involve issuing and promulgating allocation control orders, issuing shipment control orders, and possibly activating a rationing system. To conduct these functions effectively, the federal/state organizations must collect and analyze information, draw conclusions on the situation, devise alternative courses of action, decide which alternative is preferable, and inform those who need to know.

Relatively few of the many goods and services normally provided are essential to survival during an emergency evacuation. Exhibit 3.1 lists items and services considered essential for a nuclear crisis relocation. The characteristics of the major categories are discussed in the following paragraphs.

Food supply and distribution is basic to sustaining the evacuated population, and may constitute the bulk of the redistribution load. Private control of food operations can be expected to continue during emergency evacuation. Strain on the national distribution system will be minimized if corporate chains are preserved as supply and distribution units. Host area retail stores, restaurants and institutions should continue to be supplied by their pre-evacuation sources. Federal/state level operations should be addressed primarily to wholesale and consumer elements of the distribution system:

**Exhibit 3.1**  
**ESSENTIAL RESOURCES FOR EMERGENCY EVACUATION**

**FOOD SUPPLIES**

- Milk, Eggs and Meat
- Fats and Oils
- Sugars and Syrups
- Vegetables and Fruits
- Grain Products
- Salt, Spices and Other Adjuncts

**MEDICAL SUPPLIES AND EQUIPMENT**

- Pharmaceuticals and Biologicals
- Surgical Supplies and Equipment
- Blood Collecting and Dispensing Supplies
- Diagnostic Equipment and Supplies

**PUBLIC HEALTH AND SANITATION**

- Personal Hygiene Supplies
- Disinfectants, Insecticides and Rodenticides
- Cleaners and General Sanitation Materials
- Waste Disposal Equipment
- Water and Sewage Treatment Equipment and Supplies

**FUEL AND POWER**

- Petroleum, Gas and Coal
- Electric Power

**COMMUNICATIONS**

**MILITARY PRODUCTION AND SERVICES**

**CONSTRUCTION MATERIALS AND EQUIPMENT**

**GENERAL USE SUPPLIES AND EQUIPMENT**

- Tools
- Portable Lighting and Ventilations
- Batteries

**TRANSPORTATION**

- Trucks
- Automobile Supplies and Equipment
- Rail and Air Services
- Highway Materials and Equipment

- Determine food requirements in terms of use rates and geographical locations;
- Determine the capabilities of the existing food supply and distribution system;
- Select appropriate operational systems; and
- Organize, deploy, and establish procedures for state emergency operations.

Medical supplies and equipment are likely to be limited in host areas. Federal/state level operations include support to localities in providing medical supplies and equipment, safe food and water, sanitary living conditions, and disease (vector) controls. Host area officials bear direct operational responsibility. (It is hoped that this responsibility will have been considered in the allocation of evacuees.) Some medical supplies of the "home remedy" and personal hygiene type are normally provided by the food and pharmaceutical distribution systems. These will move through normal channels. Special drugs and sensitive equipment require special handling. Because they do not involve large bulk or weight, risk area wholesale stocks can be relocated to sites at or near host area medical centers.

Sewage disposal and maintenance of water potability are related, in that if sewage treatment facilities or septic tanks and cesspools become saturated, their effluents may affect potable supplies. This may require more frequent testing and additional personnel and equipment. Should corrective measures be required, the federal/state organizations may become involved in allocating both technical personnel and remedial chemical supplies.

Because crowding is inherent in emergency evacuation, communicable disease can rapidly become epidemic. Living quarters and food handling, preparation and service must be sanitary. Garbage and trash disposal should be adequately handled by host area resources, supplemented by risk area units. The federal/state organizations may be required to allocate personnel and supplies on a contingent basis.

Vector control involves the eradication of disease-carrying organisms, such as insects and rodents. Proper sanitation measures (e.g., garbage removal) are major steps in vector control. Household materials (insecticides and rodenticides) are normally part of the food distribution system, and should be continued. Materials for professional use may require higher-level allocation.

Primary fuel production and supply would be allocated by the federal government during a major emergency evacuation. In general, primary stocks are those either in the hands of the producer, in transit between the producer's facilities, or in transit by common carrier. Secondary supplies in the hands of wholesalers or distributors would be subject to state allocation. The level and degree of control would be determined by the extent of the hazard conditions. Fuel is typically divided into four categories: petroleum, gas, liquified petroleum gas, and solid fuel. The production, distribution and consumption patterns for each of these categories tend to be separate from each other.

The petroleum production and distribution system has relatively few large producers with integrated distribution and wholesale storage facilities. There are a large number of retailers and consumers with relatively small storage capacity (except perhaps large industry or utility facilities). The primary role of the federal/state level would be to allocate supplies and limit consumption by controlling the petroleum users.

Gas production and distribution is relatively fixed by pipeline capacities with limited network storage. The role of the federal/state organizations will be to control operations of gas users.

Liquified petroleum gas production and distribution is like petroleum, although it requires pressurized vessels. It is used as a gas, and may be an important source of fuel in some host areas. The demand problems resemble those for gas.

Almost all the solid fuel used is bituminous coal, and almost all the consumption is in electric power generation and manufacturing. Most users maintain substantial inventories on hand, so the role of the federal/state organizations would be limited to emergency reallocations.

Electric power generation and distribution systems are usually interconnected, so overall capacity will probably be sufficient. However, the amount of power available in any location is limited by transformer capacity. Little can be done during an emergency evacuation period to add to main distribution substation capacity, due to lack of availability and difficulty of installing large transformers. Minor adjustments may be possible. Therefore, the electric power system is typically limited to its normal capacity.

The electric power utilities have unique information about their systems and operations; they know the limits of

their flexibility; and they are experienced in dealing with emergencies. The role of the federal/state government organizations will be limited to informing the utilities of the magnitude and extent of population and organization relocation, and in the promulgation of conservation measures.

Other essential supply and distribution systems are similar to, although not as highly integrated, the food system. (Demand for food is continual and system failure could have seriously adverse effects.)

Some items are small and in common supply (e.g., batteries, hand tools, and portable lighting). These could probably be distributed best by the food system. Other items could be important for emergency evacuation. Construction materials, equipment and tools are needed for shelter upgrading and expedient shelter. Trucks would be needed for increased transportation of supplies. For most general supply items, demand is "one-time" (e.g., hand tools may be needed to augment shelter, but once on hand they would last through the relocation -- and a supply failure would be inconvenient rather than critical). Typically, local areas should expect to survive during the evacuation period with existing general supplies on hand. The federal government may assign high priority to supplying defense-related production and services during a protracted crisis relocation. These requirements must be integrated with population support operations.

Much of the existing general supply items are in the risk areas, and would be needed in the host areas. Most construction materials, supplies, equipment, and spare parts are privately owned and stocked in specialized facilities. Experienced and skilled personnel and organizations are required for operations. Many items require unique transportation equipment. Coordination of these diverse elements may become a major federal/state responsibility, requiring specialized engineering and technical skills.

Transportation support requirements are highly interactive with the distribution patterns of necessary supplies (e.g., the need to move food, fuel, pharmaceuticals) from secondary sources to the consumer, and the requirement to provide transportation for key workers who will commute daily from host area to risk area to maintain essential industries and services. It is expected that key workers will be assigned to host areas close to their work location, either in the risk area or the host area. Transportation requirements will also be determined by the type and number of vehicles and drivers chosen. The objective will be to minimize travel time and distance.



Essential supplies will be transported primarily from producers and wholesalers to consumer outlets by truck. In normal times, the capacity of distributor-owned and independent truck fleets is more than sufficient. However, an emergency evacuation would increase transit distances and times, probably increasing requirements for trucks and drivers. As noted, specialized moving equipment must be associated with construction activities. Transportation allocation, coordination and control may be a major federal/state operational requirement.

## 4. ORGANIZATION REQUIREMENTS

### 4.1 ORGANIZATION THEORY

A body of organization theory provides a basis for analyzing and evaluating emergency management and organization concepts. These theories are described in John F. Devaney's reports "Organizing the Locality for Emergency Operations" and "Evaluation of Civil Defense Systems" (References 10 and 11). One interested in organizational theory should consult Devaney's reports and his source materials. This section of the report is confined to theoretical considerations directly related to emergency evacuation organization and management.

Organization involves the selection, direction and accomplishment of tasks. Accomplishment -- doing the physical work -- falls to operating staff at the lowest levels of the organizational hierarchy. The supervisory staff controls and coordinates the operating staff. A complex network of decision processes must occur before action can be taken. The decisionmaking process begins by determining the objectives of the organization.

Three vital functions of the top authority in the executive hierarchy are to interpret the objectives, to define activities and to set times for integrated actions. To accomplish these functions, a central clearinghouse is needed to gather intelligence, make decisions, and notify other positions of relevant information and changes in plans or actions. For the central clearinghouse to effectively exercise its authority, communications should be authenticated so the staff can act for and in the name of the top authority:

- The person issuing the communication is known to occupy the clearinghouse position.
- The position is known to have authority to issue this type of communication.
- The communication is known to be an authorized issuance from that position.

There is an accepted process of building organization structures: (1) identify objectives and purposes; (2) identify activities; (3) identify decisions; (4) establish a hierarchy of decisions; and (5) derive an organizational structure. The form of the organizational structure is dictated almost entirely by the division of work. The exercise of authority inevitably requires a linear hierarchy between the top authority and the operating units. The allocation of authority in the hierarchy involves considerations of span of control (the number of subordinate units) and decentralization (the delegation of authority to lower eschelons). For emergency operations, the following criteria are significant:

- Information: Decisions are best made when the decisionmaker has reliable information about the problem, the alternative courses of action, and their likely consequences. Who has ready access to facts on which to base decisions? Shortening the distance for passing information lessens the margin of error. The decisionmaker closest to the source of the problem -- organizationally and geographically -- should have access to the most accurate information. However, he may not recognize the range of alternative solutions or their consequences on other activities.
- Competence and Capacity: Who has the competence (ability, knowledge, and experience) to make a sound decision? Competence is relative to the difficulty and complexity of the problem and its solutions. Capacity relates to workload (the amount of other work the executive and his staff have to do). What anyone can do in a given period is limited. Assigning a person more than he can do will tend to assure that he will not only fail to do that task, but also his other work. Decentralized operations require more competence and capacity at lower eschelons.
- Coordination: What is the requirement for coordinating activities between localities? If an activity neither affects nor is affected by activities or conditions outside its locale, the need for coordination is small. Extensive coordination favors centralized decisions.
- Timing: Must the decision be speedy and on-the-spot? Sometimes, in a rapidly worsening situation, the decision cannot wait on the niceties of staff studies and the use of specialist advice. In less urgent situations, the time required to make a decision may significantly affect its cost. High costs for delay favor decentralized organization.

- **Significance:** How many activities are involved and what are the cost (a) of the decision or (b) of a mistake in the decision? The greater the number of activities involved, the greater is the complexity and the need for capability. In general, the greater the cost of an error in the decision, the higher the level at which it would be made. On the other hand, the higher the level, the more it will cost to make the decision.
- **Communications:** Will reliable communications be available? For emergency organizations the nature of the disaster or the remedial activity may preclude communication at the time the decision is required. During emergencies, unreliable communications may dictate a policy of decentralization.

Organization theory provides guidelines to analyze and evaluate emergency evacuation management and organization concepts. This guidance tends to be qualitative alternatives -- elements to be evaluated -- rather than quantitative facts or rules. The following applications pertain to this analysis of emergency evacuation management concepts:

- Emergency evacuation will change the locations of products and activities, consumers, and many ongoing essential organizations, requiring the modification of existing management structures.
- Emergency evacuation will decentralize many organizational activities. Of the criteria used to evaluate the effects of decentralization, competence, capacity, and communications are probably most important.
- Span of control applies to emergency evacuation organization in the same sense as decentralization. Overextended spans of control make operations more vulnerable to intelligence and communication failures, to costly judgement errors, and to lack of competence and capacity.
- Local risk and host area organizations represent the operating echelons of the emergency evacuation management structure: they provide for the movement, reception, care and protection of the bulk of the population. They directly control most resources and personnel. However, local management depends on decisions made at higher levels to set overall objectives, allocate resources, and coordinate activities. Higher level management also provides

procedures, personnel and resources required to achieve effective and efficient local operations.

- Higher level decisionmaking requires clearinghouses for information. The clearinghouses both centralize intelligence for decisions and promulgate authenticated decisions.

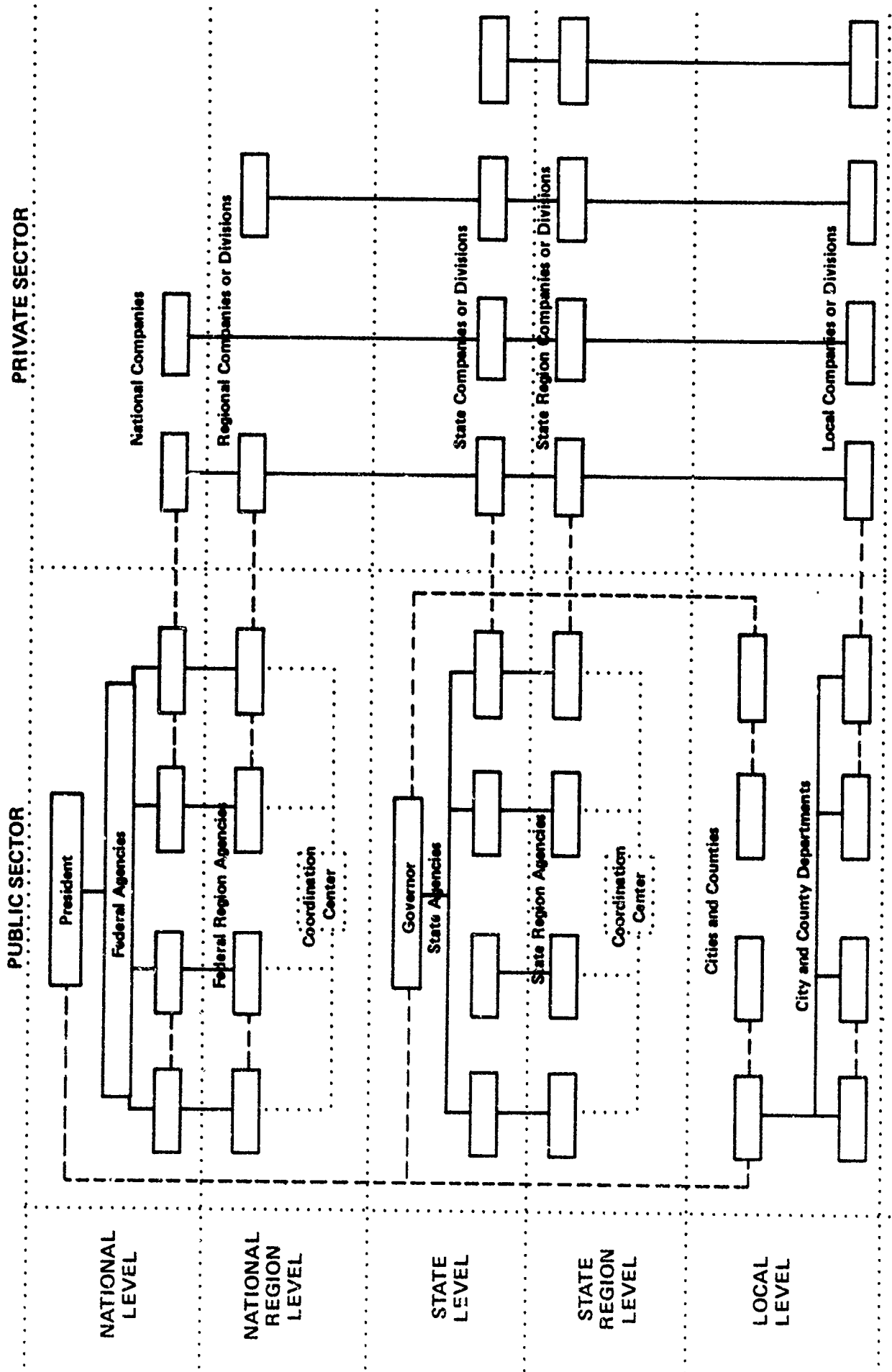
#### 4.2 PRE-DISASTER ORGANIZATION RELATIONSHIPS

For emergency evacuation, the primary consideration is to realign existing organizations (rather than creating new ones) to cope with changed objectives and operating conditions. In the realignment, existing groups should be retained if feasible. Interpersonal relationships among fellow workers are important to achieve efficient and effective operations. Over time, group members make necessary adjustments to subordinate irritations and to minimize frictions that reduce the efficiency of the organization. Each member gains assurance in his expectations of what the others will do in a given situation. There will be significant personnel problems in the transition from normal organization modes to emergency evacuation modes during the disaster-expectant and initial disaster periods.

Initial emergency evacuation planning efforts, conducted with FEMA regional support, have been directed to state and local jurisdictions and operations. With intent, the local plans reflect local environments, capabilities and preferences. Exhibit 4.1 presents a schematic summary organization chart showing the normal relations between various organizations. It is recognized that state regional organizations may not exist (or are purely administrative) in many states. The coordinating centers shown at national and state regional levels are normally stand-by organizations. They are shown here to support the discussion of Sections 4.3 and 5.2.

Normal relations of public and private organizations tend to be on vertical lines, divided by activities. Horizontal interactions are marketplace transactions, or result from overlapping functions. Reading down, the solid lines in Exhibit 4.1 represent line control; the dashed lines staff control, coordination and support. Reading up, both sets of lines represent demand and intelligence flows. There are, of course, significant degrees of difference in the line-staff control relationships for individual activities and organizations. In the schematic summary organization chart of Exhibit 4.1, the simple distinction

Exhibit 4.1 — SCHEMATIC REPRESENTATION OF PRE-EMERGENCY ORGANIZATION RELOCATIONS RELATIONS



between solid and dashed lines obscures complex individual relationships and degrees of control.

There are many examples of the diverse relationships between federal and state agencies and private organizations. The Federal Reserve Board (actually a quasi-federal agency) exerts line control over many private banking activities (typically private regional or local organizations). Department of Transportation directly regulates some elements of the interstate transportation industry. Department of Agriculture affects counterpart state agencies and local farmers by direct support and by prestigious knowledge and advice.

State government exercises control in a similar manner. Public utility commissions regulate finances and prices of private local and regional utility companies. Local jurisdictions are dependent on state agencies for revenues and direct support. School boards (and other special districts) may report to state agencies independent of city and county jurisdictions. A state police organization may, by prestige and specialized competence, exercise more control over local police departments than does the local city or county government.

Private companies frequently are directed by a corporate structure and are largely independent of local political jurisdictions. This condition may be reinforced by special ties between the industry and higher echelons of government, such as the finance and defense industries. Federal and state regulatory agencies sometimes preempt local jurisdictional control.

The typical structure of private organizations is that very large organizations are found at the extractive or manufacturing level, medium size organizations are at the wholesale distribution level, and many smaller organizations are at the local retail level. The large organizations tend to dominate this chain because their size and financial resources give them expertise and credit beyond the capabilities of smaller firms. Thus, for emergency operations contacts at national or regional level may sufficiently access the industry. Vertically integrated industries (petroleum and telecommunications) are centrally controlled. Large regional retail and wholesale chains dominate the food industry. Electric and natural gas public utility companies are often vertically integrated at regional level. However, when considering the emergency evacuation activities (Section 3) there are many variations to the typical or standard operating modes of the private sector. Thus, an emergency operations structure must be flexible to allow access according to the particular organization situation in various areas.

#### 4.3 EMERGENCY DECISION AND COORDINATION REQUIREMENTS

Present emergency organizations and management systems have evolved to meet the hazards of moderate, recurring disasters. As the nation's society and economy have grown more complex and more interdependent, emergency response systems have also grown. The emergency systems, based on graduated response to hazard impact level, have served well. The nation has not been subject to the catastrophic effects of nuclear disasters, to prolonged denial periods from large regions, nor to cumulative wide-area hazards of simultaneous lesser disasters. Nuclear (and other hazardous materials) disaster response is a topical, emotional and political issue with the federal and state organizations (including FEMA) at the focal points. The report of the President's Commission on the Three Mile Island Accident stated: "We are disturbed both by the highly uneven quality of emergency plans and by the problems created by multiple jurisdictions in the case of a radiation emergency...We found an almost total lack of detailed plans in the local communities around Three Mile Island. It is one of the many ironies of this event that the most relevant planning by local authorities took place during the accident...The response to the emergency was dominated by an atmosphere of almost total confusion" (as quoted in Reference 12).

Research and extrapolation of experiences with natural disasters indicate that the United States has sufficient resources, services, and technical knowledge to cope with catastrophic disasters. The task of this research is to highlight potential management system deficiencies, recognizing that exceptional capabilities exist in some areas of the country. The analysis is perforce qualitative because the subject of emergency evacuation management effectiveness is qualitative.

Organization relations (as shown in Exhibit 4.1) will change if the country moves from normal times to emergency evacuation for catastrophic disasters. The degree of change will depend on expectations about the severity, extent and duration of the threat. A potential problem is that there is little provision in current plans for a transition from normal to emergency evacuation relations between federal and state agencies and private organizations (as shown in the schematic chart of Exhibit 4.1). The Federal Regional Coordinating Center may be activated to provide an important coordinating function between federal agencies. (In moderate disasters, the coordination is accomplished in a decentralized mode.) This would recognize an increased federal role resulting from the need to adjudicate and allocate resources and to control activities (by rationing, monetary controls, direct



support and the like). Under catastrophic evacuation disaster conditions, some federal coordination might become control activities. If restricted or saturated communications were expected, the Regional center might be called upon to assume intermediate, decentralized authority. The regional headquarters of most federal agencies are in risk areas and might be relocated under evacuation conditions; the Regional center might serve as a "clearinghouse" described in Section 4.1. In particular, to the extent that federal government assumed increased control over private regional organizations, there would be increased need to coordinate and authenticate lines of authority.

State government and agency roles are similar to those of the federal government, with several important exceptions. FEMA emergency evacuation planning guidance indicates state authority and responsibility for designating essential organizations and for allocating resources. These activities are certain to strain the capacities of most state agencies and of central state control. One state's officials note that "a flood of requests to the state office will easily overload the current system and put the staff in shock." Many state capitols (and their EOC's) are located in risk areas, as are state regional offices. The dashed lines of Exhibit 4.1 from state to regional organizations are tenuous in normal times, often more characterized by competition than coordination.

Large regional private organizations are managed by specialists in the acquisition, production, allocation and distribution of their resources. They are usually headquartered in risk areas and they tend to owe allegiance to their parent organization and to suppliers, employees and customers. Under emergency evacuation conditions, with the staffs of both state and private organizations dispersed, communication and coordination will be difficult, both to determine essential activities and to allocate resources.

Local level government and private organizations are the primary operating units, supervising and accomplishing the production and distribution of goods and services, and sheltering and feeding the population. Exercise of state authority and responsibility under emergency evacuation, relative to the many local cities, counties and private organizations, will be especially difficult in populous areas (as the Northeast Corridor). Local organizations are (millions of times) more numerous and diverse than can be shown in Exhibit 4.1. In all areas, the ability of the states to acquire reliable intelligence, to make effective decisions, and to direct operations will be strained by the large number of subordinate units.

In addition to essential industries, central (risk) cities normally house the headquarter operations of federal, state and regional organizations. Many host area activities, except local political control, are directed from risk areas. Most production, processing, warehousing and distribution activities are centralized in risk areas, along with the sophisticated services necessary for efficient operation and control. Many organizations have become dependent on computerized systems to control production, distribution and financial activities. Specialized resources and activities exist in risk areas to serve the concentrated urban population. For these functions, it would be logical to show risk areas at a separate organizational level above host areas. (It was not done because of the equal political status.)

During emergency evacuation, the unique viable strengths of risk area organizations will be essential to support host area operations and the relocated urban population. Host area management should concentrate on the immediate day-to-day operations of caring for the refugee population, maintaining host area population, and expanding economic activities. On a self-help basis, host areas may be expected to find, train and place personnel to accomplish their day-to-day activities. This will tend to saturate their capabilities, so they cannot be expected to have reserves to cover contingencies, nor to provide management for regional activities or special programs (as for upgrading or building expedient shelters).

The analyses of emergency evacuation activities in Section 3 indicate that there will be significant numbers of critical policy decisions to be made at all levels of organization. Decentralizing many vital decisions and increasing span of control would oversaturate the capacities of most local level managers, and require decisions beyond local knowledge, authority and responsibility. This indicates the need for effective management control on a centralized basis. Unfortunately, merely assigning authority and responsibility to higher echelons in either a command or coordinative mode of organization provides little confidence that decisions will result in adequate, equitable or efficient operations. The dispersal of organizations indicates the need to supplement decentralized middle-management capability and capacity to compensate for losses of normal reliable communications, for uncertain intelligence to and from higher echelons, and for shortages of qualified personnel at state, regional and national levels.

The schematic chart (Exhibit 4.1) provides a basis for consideration of the transition from peacetime to emergency management organization, while preserving basic line-staff

relations at all levels. This accords to the principles of efficiency of Sections 4.1 and 4.2. However, as noted, it obscures the disruption to the complex relations imposed by the dispersal of risk area management activities. The task of reassembling these activities either into existing host management or into state agencies would introduce inefficiencies, loss of communication and control, and conflicts of authority. It appears more feasible to enhance the current capabilities and capacities of state and federal region coordinating centers, i.e. the middle management center concept.

## 5. A STRUCTURE FOR EVACUATION MANAGEMENT

### 5.1 PRESENT EMERGENCY MANAGEMENT SYSTEM

Present emergency management concepts and organizations, as noted in Section 4, have evolved to meet recurring disaster hazards. Initial responsibility is borne by local organizations. As the severity and extent of the hazard increases, higher level organizations become involved in the coordination of local efforts and in the contribution of special support resources and personnel. Following the declaration of a state of disaster by a Governor and the President, state and federal civil and military agencies typically commit resources from local and regional levels. The federal activities to support local government, remain under the direction of each agency's hierarchy, sometimes coordinated on an ad hoc basis by a lead agency designated by the President. While this system has worked adequately in the past, it has not resulted in a centralized state/federal level organization with trained personnel, procedures and resources. Also, the system primarily relates to natural disaster events; While there have been some federal exercises, the system has not been tested by nuclear operations which are the primary interest of this report.

Concepts of centralized versus decentralized management control (as noted in Section 4.1), are not inherently "good or bad," nor are they subject to analysis by quantitative criteria. Concepts of span of control and line versus staff organization are similarly limited. Thus, when reorganization (caused in this case by emergency evacuation) is considered, the analyst strives to minimize organizational changes and to preserve prior jurisdictions and functions. The rationale for this judgement is based on firm principles which recognize organizational needs for confidence between individuals in matters of authority and responsibility, competence and capacity, information and intelligence, communication capabilities, and judgement for timing and significance of decisions. Individuals who have worked together over a period of time in a stable relationship will have ironed out their problems and achieved the confidence necessary for efficient operations.

The reorganizational structure implicit in FEMA nuclear crisis relocation planning guidance partially recognizes these principles. Organizations continue in their prior jurisdictions and activities. Essential risk area organization operating units are preserved by relocation to host areas or by commuting if relocation is not feasible. The higher level control and decisionmaking structure is incorporated in state-level coordinating committees. Except where necessitated by anticipated shortages, command versus coordination and line versus staff relations are also preserved. Unique nuclear crisis relocation functions (e.g., reception and care and fallout shelters) are assigned to operating jurisdictions, host areas, with staff augmentation from relocated personnel.

However, analyses of the emergency evacuation management structure indicates several weaknesses according to accepted organization principles and criteria:

- The overall effect of large-scale emergency evacuation is to disperse population, resources and organizations. Present emergency management planning is to decentralize middle and operating management to host areas and to centralize decisionmaking management in state-level (or state/region-level) agencies.
- This change shortens the chain of command, which broadens the span of control. Typically, more reliable information, more competence and capacity and clearer lines of authority and coordination are required for this type of organization..
- Anticipated and real catastrophic hazard effects, and the evacuation itself will decrease production and distribution capabilities. Separation of risk area personnel from their normal resources, jurisdictions and organizations will tend to produce conflicts of authority at operating and middle management levels. System reliability and confidence will decrease, and personnel will be faced with unfamiliar decision responsibilities. Significance (cost of mistakes) of decisions, will increase. Thus, middle and top-level management coordination and support requirements will increase.
- The number of demands and amount of information passed up from operating to middle and top-levels will increase, as will the decisions and controls passed down. There will be increased needs for horizontal coordination between both public and private agencies. Normal communication channels will be lengthened, intelligence systems will be disrupted, and normal "clearinghouses" to compile information and authenticate authority will be eliminated. Public

information sources will be independent of local control and coordination. Disaster conditions will be unfamiliar and news will be subject to various interpretations. An extraordinary burden will be placed on all communications facilities.

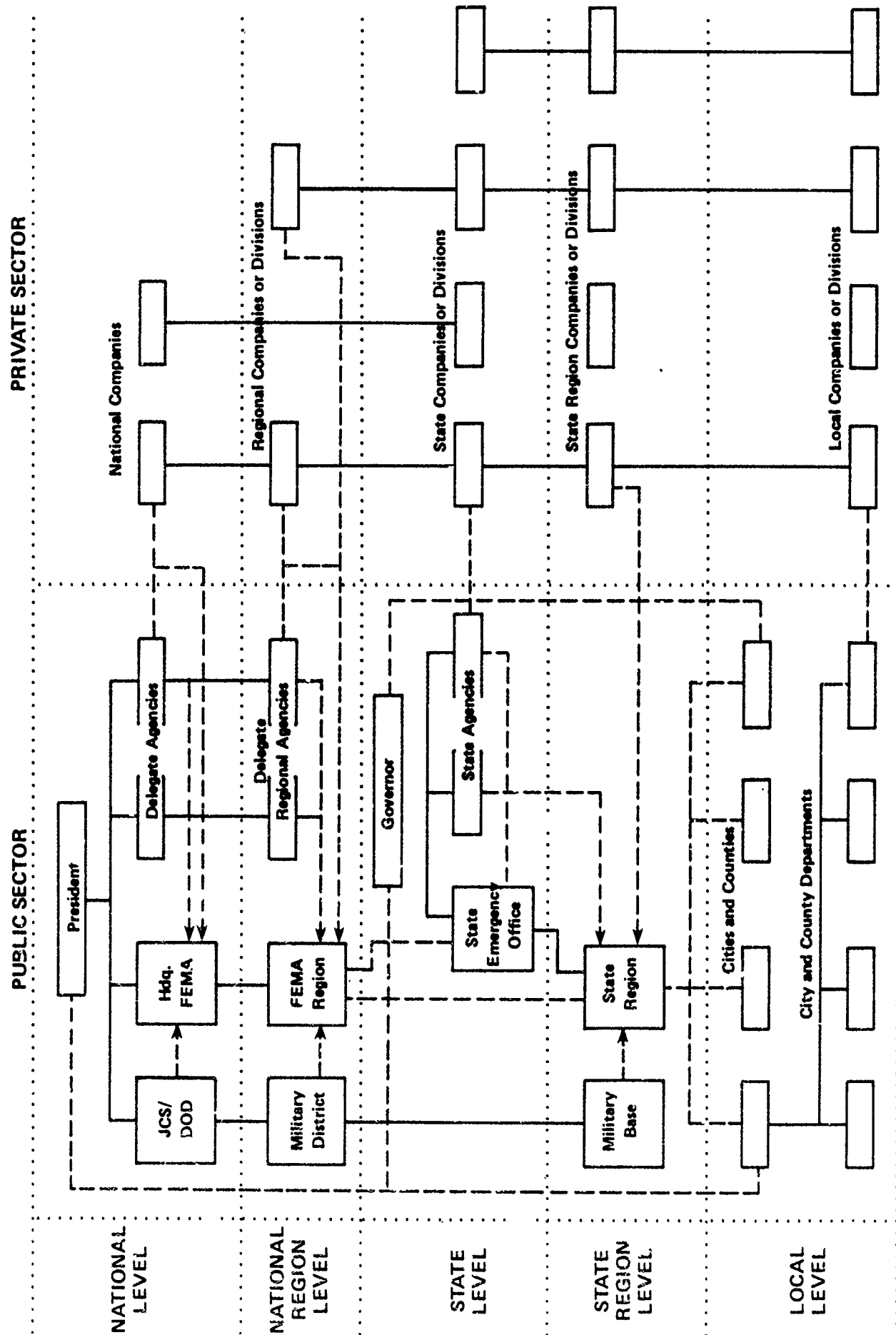
Considering the requirements relative to the resources, capabilities, and flexibilities of present organizations, and to the expectation of moderate disasters, it is difficult to justify any modification of present organizational structure. Considering the requirements relative to large-scale emergency evacuation and catastrophic disasters, especially nuclear war crisis relocation, it is difficult to predict any outcome short of chaos.

## 5.2 DECENTRALIZED FEDERAL/STATE LEVEL MIDDLE MANAGEMENT CENTERS

Earlier research studies (References 1 and 2) analyzed local capabilities to accomplish emergency evacuation operations for catastrophic disasters. These analyses revealed local weaknesses which led to the concept of a middle management center (MMC). The MMC would coordinate the emergency activities of each evacuation area. It would function as a clearinghouse for intelligence and as a decisionmaking body for the allocation of relocation area personnel and resources. The centers would also serve as a focal point for contacts with state and federal government agencies. Exhibit 5.1 introduces a schematic emergency management structure from Presidential to local operating level in a format comparable to the normal organizations of Exhibit 4.1.

The nation would be divided into several hundred "evacuation areas" (including both risk and host cities and counties) based on existing state regions, risk/host conglomerates and economic/trading area definitions. This state-region (or evacuation area) would be the first level emergency middle management center. Many existing state and regional organizations are based on similar geographic, economic, or political areas. Mutual aid compacts provide for inter-jurisdiction support. Other precedents for such organization is found in metropolitan area authorities and in regional private and government entities. Risk and host area jurisdiction operating units and organizational structures would be maintained. Host area organizations would manage increased demand by expanding operations with auxiliary personnel from the host area and relocatee population. This would be accomplished on a self-help,

Exhibit 5.1 — SCHEMATIC REPRESENTATION OF EMERGENCY ORGANIZATION RELATIONS



best-effort, training-on-the-job basis. Specialized risk area operating units would be maintained intact (not dispersed as "fillers" for host organizations), except for those (e.g., schools) whose clientele were completely dispersed. These organizations would be employed to meet risk area needs or to be dispatched (at host area request and MMC direction) to offer contingent support. Unless prohibited by disaster effects, local public and private essential operations would be managed by department personnel at the usual dispatcher or headquarter sites.

State-region MMCs, formed for each evacuation area, would be delegated authority to act for federal and state governments, and to coordinate public and private organizations in all matters internal to the emergency evacuation area. Other regional middle-management organizations would operate from normal headquarters in communication with the MMC. The MMC also would be responsible for preparing and disseminating public information, for upgrading and constructing fallout shelters, and for coordinating RADEF operations. Organization relations would vary between areas. Small states might include a single evacuation area, allowing direct state control. Evacuation areas involving two or more states would require joint representation. If the evacuation area were wholly within one state, a state official might be in charge; if the area overlapped state boundaries, a federal official might be in charge. It is important that the individual in charge be a person of stature capable to command public and private community respect.

The MMC staff would include representatives from local jurisdictions and essential federal, state and industrial organizations. (Many small organizations would be represented by a dominant company or an association representative.) The representatives would coordinate intelligence and operations for jurisdictions on a functional basis. It will be difficult to find suitable staff for the MMC. Obviously they should be experienced in emergency operations, competent to make decisions, and command respect at local, state and federal region levels. In addition, they should be intimately acquainted with major evacuation area transportation, communications, and utility networks, and the organizations (private, military, state and federal) that can restore critical outages. Personnel are needed who "know the terrain" in the evacuation area, i.e., ways and means to get from Point A to Point B via detour C, using highways, railways, waterways, and airways. Complementing them would be movement control personnel who know the logistics involved in moving forces and material resources, and therefore the feasibility of proposed actions. Pre-emergency selection,



indoctrination and training of qualified personnel is essential.

The MMC should be sited to ensure physical protection and communication capacity. Ideally, it would be located at the population and transportation centroid of the evacuation area, outside the risk area. (A separate study [Reference 13] concerns the availability and capability of EOC's, and investigates the feasibility of State Highway Department sites.) The report of the Investigation Staff for the Boland committee drew the following conclusions regarding EOC's and communications: "...all EOC's must have...sufficient space for uncluttered planning conference areas [and]...incorporate factors of independent water supply, generators for independent power and light, sanitation, food supplies and radiation equipment."

"A mobile EOC faces different but, nevertheless, complex problems. It must be of sufficient size to accommodate all essential communication equipment and personnel; be housed in a temporary protective facility to ensure initial survivability, and have preselected sites that can accommodate key officials. Above all, its movement must be governed by detailed plans which ensure prompt joining of leadership, communications, and other essentials necessary for life and operations in a self-sustaining mode."

"To effectively direct and control, executives and staff must have immediate access to communication networks that receive and transmit instructions. To fulfill these needs, FEMA has directed that an EOC, to acquire a fully qualified emergency communication rating, must meet the following standards:

- a) Wire communications with: (1) primary local operating forces, e.g., police, fire, public works, etc., which in most instances are governmental; (2) other forces, e.g., hospitals, transportation companies, utilities, etc., with emergency assignments and capabilities; (3) radio and TV stations serving the area; (4) the next higher level EOC; (5) radiological monitoring stations, and (6) shelters.
- b) Reliable backup communications with forces and installations listed in (1) above. Radio communications are also highly desirable with monitoring stations and shelters.

"In view of problems involved in CRP movement, it is now essential that communications exist between neighboring jurisdictional host EOC's and host-risk EOC's.

Communication links, for survivability, must consist of more than one mode, radio and dedicated land line (telephone) being the main two elements currently available." (Reference 14)

State (and state-agency) headquarter operations might be relocated to secure facilities. They would coordinate activities between the state-region MMCs and would allocate state resources and personnel between evacuation areas. The national guard would be a vital state resource if it were not mobilized by the federal military.

Federal region coordination centers would represent the middle management level between FEMA and delegate agency headquarters and state and evacuation area centers. Federal headquarter operations, while beyond the scope of this research effort, must be conceptualized because the activities of subordinate levels are designed to carry out the objectives, policies and directives of top-level authorities. (The concept presented here of a top-level organization is based on an earlier study of DCPA headquarters operations, Reference 9.)

FEMA's headquarters organizational alignment is viewed as similar to a headquarters military staff responsible for overseeing military operations in several theatres. The headquarters staff does not "operate" in the literal sense of the word; it makes major decisions as to what operations will be conducted, the emphasis of timing of operations, and level of support accorded to each theatre. As Neperud pointed out, "The closest analogy we found -- and there may be better ones -- was the WWII Operations Division of the War Department organized by then chief of staff George C. Marshall. This was a decisionmaking and directive-issuing staff (always in the name of the Chief of Staff, of course) that provided the link between the requirements of military theatres of operation (analogously, federal region coordination center for emergency operations), assessment of the feasibility of supporting those requirements by the three headquarters commands -- Army Ground, Army Air, and Army Service Forces -- (analogously, the federal delegate agencies and military support forces), and the relative urgencies, controls, and overall policies and priorities established by the Joint and Combined Chiefs of Staff (analogously, the President and White House staff). The keys to the success of this division lay in delegating operational detail to the theatre commanders -- in effect, the mission was defined and given to the theatre commanders to carry out as they best saw fit -- and in staffing the division heavily with representatives of the three headquarters commands, thus making those responsible for carrying out the directives of the Operations Division part of the decisionmaking process." (Reference 9)

An "Operations Division" for FEMA Headquarters should be heavily staffed with representatives of the federal resource (delegate) agencies and the defense department. Civil emergency operations for catastrophic disasters (as crisis relocation) are considered at least as important as military combat operations. The most expert representatives of those agencies should be detailed to FEMA, not in a loose liaison capacity but as an integral part of the FEMA Headquarters emergency operations division. They would function as the authorities on the organized emergency capabilities and material resources owned or controlled by their parent agencies. Thus, they would be in a position to both assess the feasibility of proposed nationally directed emergency activities and to expedite the organization and application of the resources in accordance with executive order assignment. They could also distinguish between military and civil priorities.

The federal regional coordination centers would be responsible for federal activities in each of the FEMA regions (theatres of operations). As for the Headquarters, these federal region MMC's should be heavily staffed by personnel from the resource agencies, the military and large private organizations. Operations of these supporting organizations, conducted at evacuation area level, could be directed from normal (or secure relocation) sites. The organizational role of regional centers would be to ensure that the major decisions of the Headquarters were implemented. They should know the resources and capabilities of the support organizations, assess the relative needs and priorities of the evacuation areas, and decide which resources to apply where.

To staff the federal regional centers, personnel are needed who are widely experienced in disaster operations, nuclear attack and natural disaster effects, and the probable severe environmental constraints in conducting emergency evacuation operations. These personnel preferably should have been heavily involved in the development of national civil emergency contingency plans, have a realistic knowledge of the organizations and material resources likely to be available for conducting emergency operations, have the ability to make sound decisions in the face of fragmentary operational situation information, be able to pull together the diverse management officials involved and have the ability to skillfully and accurately present requirements of the civil population to higher authority. As with headquarter staffing, key personnel should be drawn from regional federal, military and civil agencies. A state official (Arizona) advocated the appointment of action officers from state agencies and regional private supplier and distribution organizations.

### 5.3 LOGIC TO ALLOCATE RESPONSIBILITIES TO REGIONAL CENTERS

The organization structure proposed in Section 5.2 was derived from analyses of decision requirements according to accepted organization theories (Section 4.1). Provision of two levels of emergency middle management centers (the federal and the state region levels) is based on considerations of decentralization and span of control. It appears to best fit (involve the fewest changes from) normal organization structures. Federal headquarters would deal with ten federal regional organizations which in turn would each deal with 15 to 25 state and state/region centers. These appear reasonable dimensions to allow effective decisionmaking. However, variations between individual areas will be so great as to preclude theoretical prejudgement. The management system can be refined only by accepting a concept of operations, establishing an organization structure and exercising the structure.

The declaration of an emergency or disaster condition would remain a political decision to be determined by governors and the President. The organization structure proposed in Section 5.2 could provide consistent, reliable and evaluated assessments of local conditions to assist the high authority decisions. Catastrophic disasters frequently provide sufficient warning time to allow meaningful assessments. Upon declaration of emergency or disaster conditions, federal headquarters and appropriate federal and state region centers would be activated so they could position themselves to operate should the disaster prove catastrophic. Present procedures for escalating disaster effects would be followed (i.e., the local area responds first, if conditions worsen adjacent and higher level organizations become involved). The middle management centers would participate only in activities and to the extent that their unique capabilities were required. Another characteristic of catastrophic disasters, requiring extensive population relocation, is that they are likely to escalate rapidly and overtly. The formal steps of involvement may be compressed to a few key decisions, activating the entire system.

Emergency evacuation activities were outlined in Section 3, with emphasis on federal/state level decisions. These coordination and support requirements are summarized in Exhibit 5.2. Most activities remain with local organizations operating within their jurisdictions. Allocation of decisions between the levels of the federal/state central and regional management structure will depend on qualitative considerations (Section 4.1). Decisions requiring rapid response with on-hand resources

Exhibit 5.2  
**FEDERAL/STATE LEVEL COORDINATION AND  
SUPPORT REQUIREMENTS FOR EMERGENCY EVACUATIONS**

- **DIRECTION AND CONTROL**

- *Headquarters operations:* Evaluate, decide and implement objectives and procedures. Determine time phased operations. Establish and maintain secure locations. Prepare emergency regulations to alleviate disaster effects (i.e. modify licensing and regulating procedures, establish consumption controls.)
- *Warning:* Identify hazards, determine potential effects, evaluate countermeasures, decide actions, promulgate decisions.
- *Communications:* Coordinate private and public systems to ensure linkage between essential organizations and centers, to provide control for the integrated network.
- *Emergency Public Information:* Select media for coverage, appropriateness and redundancy. Communicate state and federal decisions, instructions and background information.
- *Economic and Financial:* Identify dislocations, determine alternative responses and regulations, make decisions, promulgate decisions.

- **MOVEMENT, RECEPTION AND CARE, AND PUBLIC SAFETY**

- *Movement:* Initiate pre-disaster plans to identify risk and host areas and transportation vehicles and routes. Provide personnel and resources to assist movement control.
- *Reception and Care:* Maintain and dispatch contingent support capabilities to augment local operations.
- *Law Enforcement and Fire Protection:* Surveillance of local operations to permit reassignment of population. Maintenance and dispatch of contingent reserves to augment local forces.
- *Medical and Health:* Allocate personnel, equipment and resources to local areas to alleviate imbalances. Provide for specialized activities in risk areas.

- **RESOURCES, SUPPLIES AND SHELTERS**

- *Supply and Demand:* Determine what essential goods and services are to be supplied. Determine the needs of the redistributed population. Specify quantities and recipients.

Exhibit 5.2 – Continued

• **RESOURCES, SUPPLIES AND SHELTERS (Continued)**

- *Food Supply:* Ensure coordinated private operations at production and wholesale levels to serve relocated population.
- *Medical and Health Supplies:* Allocate scarce supplies and personnel of public and private organizations.
- *Fuel Production and Supplies:* Allocate supplies at production and wholesale levels. Inform private organizations of redistribution of demand.
- *General Supply and Construction Resources:* Identify critical resources and allocate to local areas.
- *Transportation:* Ensure coordination of resources and needs. Prepare to assume major allocation, coordination and control requirements.
- *Shelters:* Coordinate and allocate construction personnel, equipment and supplies for effective utilization.
- *RADEF:* Coordinate and allocate technical personnel, equipment and supplies.

will be made at evacuation area (state region) level. Decisions involving allocations and coordination between evacuation areas will be made at state or federal region level. Far-reaching decisions, such as economic and monetary controls, will be made at federal headquarters level.

Decision levels may also be considered on a time-phased basis relative to disaster effects and countermeasure activities -- basic (or warning), movement and maintenance phase activities. There are fundamental and pervasive requirements for essential emergency evacuation operations which are largely independent of the nature, extent or time phase of the hazard. These include requirements to maintain organizational integrity and prepare to conduct operations in an emergency posture, give warning, determine economic and regulatory responses, ensure operating communications, and communicate emergency information to the public.

The roles of federal and state level regional organizations are to establish emergency measures and procedures, and to support local area operations with available resources. For emergency public information, it appears necessary for federal and state officials to communicate directly with the public to establish the validity of the defined hazard and the necessity for the countermeasures.

National guard, military and state police activities are difficult to categorize because of different organizational arrangements, different resource capabilities, different response patterns to individual hazard conditions, and the possible preemption of the national guard by the federal government in a war situation. As with economic controls, local governments must expect that state and federal levels will judge the specific conditions and make appropriate policy decisions in the light of those judgements.

The basic requirements for local host and risk public and private organizations are similar -- their transitions from normal to emergency evacuation activities involve maintenance of production, distribution and service capabilities. A difference is that host areas prepare to receive and care for the relocated population, while risk areas prepare to evacuate people and to extend support from their relatively greater resources.

Emergency evacuation movement activities -- traffic control, reception and care and maintenance of essential operations - are primarily responsibilities of local host and risk areas. Traffic control operations are handled by

local law enforcement personnel supplemented by auxiliaries within their normal jurisdictions. Local fire and mobile medical unit support is required. The risk area law enforcement controls egress, state highway patrol controls arterial movement, and host area law enforcement controls ingress. Except for contingent support by risk and regional organizations, host areas must operate largely with their own resources supplemented with auxiliaries and recruits from the relocatee population.

Risk area operations during the movement phase -- other than traffic control - are sensitive to the nature of the hazard. The deployment of risk area public safety forces will depend primarily on judgements by local elected officials and department heads. Critical decisions regarding headquarter relocation and support commitments will affect continuing operations capabilities. It will be vital for essential risk area organizations to keep track of key personnel and maintain control of resources.

The activities of federal and state middle management organizations are principally to monitor the movement and to adjust objectives and procedures to alleviate difficulties. These organizations may also be required to provide and commit contingent support for local operations for functions such as movement control on arterial highways, security and logistic support for essential risk area organizations, and emergency medical needs. The final determination of essential versus non-essential operations depends on higher-level determination of the nature of the hazard and the need for continuing support during the maintenance phase.

Once the emergency relocation of the population approaches completion, it will be necessary to conduct essential operations to maintain and sustain the population, and to ensure meeting special requirements (e.g., defense production and shelter protection in the nuclear disaster case). The maintenance period is characterized by the continuation of essential production and distribution activities in the risk areas, and population maintenance and care in the host areas. Federal and state regional organizations should monitor the developing situation, consider population reallocation, and establish emergency measures and procedures. Both risk area and regional organizations will maintain contingent support units to handle special problems in the risk and host areas, and to provide emergency services should the disaster strike (or be extended).

The deployment of support units will pose difficult problems for decisionmakers during both the movement and maintenance phases of emergency evacuation. The



traditional role of emergency forces is to respond quickly to emerging disasters to mitigate their effects. Normally, this involves complete commitment of resources to immediate problems. For emergency evacuations involving long maintenance phase operations and evolving stresses on population and industry, the early commitment of reserves may be dysfunctional.

During catastrophic disasters, decisionmakers at all levels will be dealing with organizations and personnel operating in unfamiliar roles, and communications will be sparse, garbled, and conflicting. Normal intelligence sources will be eliminated or obscured. Thus, a major burden will be imposed on the regional middle management coordinating center both to support and monitor local conditions, and to communicate the situation to top-level decisionmaking authorities. In cases of local operating breakdowns, they may be required to assume control of operations.

Other activities unique to the disaster conditions may evolve, requiring support by regional organizations. Fallout shelter protection from nuclear radiation, as well as radiological monitoring and decontamination, is an activity not normally provided by local governments and organizations. In many areas, deficiencies can be expected, and all jurisdictions will have incentives to enhance their protection. Resources for upgrading or constructing fallout shelters and conducting radiological defense are scarce and unevenly distributed among jurisdictions. Thus, it appears that it may fall to regional organizations to assume responsibility for these activities.

## 6. EVALUATION OF MIDDLE MANAGEMENT CENTERS FOR EMERGENCY EVACUATION

### 6.1 BENEFITS OF REGIONAL MIDDLE MANAGEMENT CENTERS

To deal with the effects of catastrophies -- particularly war-caused -- there is need for direction and control of federal civil activities below Presidential level. At the present time the logical organizational slot appears to be FEMA because it already encompasses many federal emergency coordination and mitigation activities. (The proper organizational arrangement for the activities has been debated and resolved differently several times in the past, and may well continue to be debated in the future.) Civil emergency activities are recognizably different from the military activities -- each mutually supportive. The delegation of authority to FEMA headquarters and regional coordination centers to direct and coordinate federal activities to counter the effects of catastrophic disaster would not dilute Presidential-level authorities to mobilize and allocate resources. Nor would it dilute authorities of state and local governments to manage their activities -- rather it would provide interstate top-level administration, resource support and technical expertise on a coordinated basis.

Civil emergency activities involving evacuation of large numbers of people for prolonged periods are also recognizably different from normal civil (public and private) activities. The state or state/region coordinating centers are designed to meet the unique requirements imposed by these catastrophic disasters. The middle management centers would assume responsibility for activities and coordination not provided by normal government or private organizations. They would operate at a level (the evacuation area) broad enough to overview operating tasks of local organizations on a comprehensive basis. They would be close enough to local operations to have first-hand knowledge of local problems, priorities and needs. Properly staffed, they would reinforce (not dilute) the authorities of state and federal agencies and private organizations.

The oft-quoted Eisenhower dictum is appropriate: "Plans are worthless, but planning is everything...keep

yourself steeped in the character of the problem you may one time be called upon to solve -- or to help to solve." (As quoted in Reference 15.) Full-scale, all-hazard plans, while obviously an attractive ideal, are seldom achieved: they are expensive, require constant updating and must be adjusted to the particular event. They generally reflect routine organization operations and relationships, and are too abstract and ponderous for rapid response to immediate threats. During field interviews, we are frequently reminded by local department heads that they respond to emergencies by applying personnel and resources according to standard operating procedures and observed hazards. Most do not consult comprehensive contingency plans.

At Mississauga local sources credited the success of evacuation operation partially to "professional pre-planning, tested in a number of recent emergencies, including an air crash and a refinery tank farm fire" (Reference 16). However, a FFMA official noted that "Contrary to many newspaper and other reports we did not discern the existence of significantly meaningful emergency plans which could be the basis for the successful operations" (Reference 17). The Boland Committee staff noted: "Plans in themselves are of little value in an emergency when key officials are unaware either of the plans or their responsibilities in conducting coordinated emergency operations." (Reference 14) Both the TMI and Mt. St. Helens event responses were without applicable evacuation plans. During the pre-eruption period at Mt. St. Helens, issues concerned control of the airspace and the relatively few loggers, residents and tourists on the mountainside. Efforts were sporadic. After the eruption primary efforts were devoted to search and rescue and mitigating the damage from the ashfall. (References 18, 19, 20 and 21.) Popular and political discussions often centered on recriminations and lack of financial responsibilities (References 22 and 23).

There had been limited evacuation planning at TMI based on a five mile radius evacuation zone, which meant that most evacuees could be cared for in their resident counties. Expansion of the risk area to a 10 or 20 mile radius not only vastly increased the number of evacuees, but also required the involvement of numerous host counties. As a result, the original plans were of little value to officials responding to the emergency. In developing the revised plans, the data and expertise of state and DCPA officials, gained from the CRP experience, was invaluable to local planners (References 24 and 25).

While emergency management capability should include preparations for major population evacuations, most local jurisdictions find it difficult to plan or maintain

emergency operations capabilities, except by their emergency services for recurring local events. A comprehensive contingency plan drawn in 1982 to deal with a 1985 catastrophe will be quickly obsoleted by environmental and personnel changes. Moreover, the actual catastrophe will seldom precisely fit planning assumptions, and countermeasure procedures will be subject to modification. In another sense, such planning is vital. Should the federal government implement the concept of emergency federal/state level middle management centers, contingency planning would keep the staffs "steeped in the character of the problem" and would provide the basis for training exercises and definition of organization roles.

Present FEMA crisis relocation efforts are typical contingency plans. They are responsive to a particular hazard, with unique response conditions and requirements. Crisis relocation planning could be used to enhance middle management capabilities by providing the following beneficial measures:

- Develop data on institutions and special groups requiring assistance, and on resources available to serve these groups (transportation, accommodations and personnel).
- Make provisions for augmenting small emergency management staffs at time of emergency, including notification procedures, check-lists and instructions for key personnel.
- Develop adequate, expandable and mobile (or alternative) facilities for emergency planning and operating personnel.
- Provide planned, redundant communications to and between local emergency organizations, and with decisionmaking organizations with special hazard expertise.
- Prepare procedures and materials to warn and instruct the public under different types and categories of emergencies.

## 6.2 FEASIBILITY OF IMPLEMENTING CENTERS

FEMA staff members are well aware of the difficulties of initiating and maintaining emergency plans, management staff and operations capabilities when disasters are regarded as improbable events with uncertain consequences. While, logically as much as possible should be accomplished as early as possible, it is likely that emergency preparation activities will remain low priority items for all levels of government. Thus, it must be conceded that it would be difficult to implement the proposed management structure under present conditions and attitudes. This assessment is supported by the findings of the research on local area management requirements (References 1 and 2), experiences in the Los Angeles County attempts at regional organization (Reference 26), and numerous other surveys. At the same time, there is encouragement from the experiences of several states (such as Texas), with regional organization and from the apparent federal administration decisions to augment civil emergency preparedness. This section of the report addresses fundamental considerations involved in implementing a management structure and suggests a course to accommodate the considerations.

At the local level, a study of New England municipal governments is instructive: "There is a lack of urgency or priority about emergency planning among local officials and citizens...because of the infrequency of disasters compared to other day-to-day problems confronting municipal government officials, and because there is no obvious return to citizen tax investments for emergency planning" (Reference 27). Further, it has often been observed that officials become concerned only in the aftermath of major disaster. A California earthquake survey found that "Interest in disaster preparedness increases following a major disaster, proportional to the damage produced. However, this interest passes quickly as residents and local leaders seek to return as soon as possible to normal conditions. Important lessons about mitigation and hazards reduction are lost during the rehabilitation period due to lack of programs to direct and channel this increased awareness" (Reference 28). This lack of continuing concern at all government levels for disaster preparedness is a major impediment to developing a comprehensive emergency management system.

A related consideration needs to be addressed by this study. At all levels, there is a persistent notion by many civil officials that the military will (or must) assume the command/control role for catastrophic disasters. This attitude is expressed only after formal discussions of plans and capabilities, after interview notes are put away.

Therefore, it is off-the-record and cannot be documented. The logic is straightforward. "The military has resources, personnel, prestige and organization to do the job -- we do not." (In the combined years of military and civil defense experience of the authors, we have never heard an active-duty military officer concur with this attitude. The military is firmly imbued with the doctrine that combat is the primary mission, and support to civil government is a secondary mission.) Perhaps this civil attitude is reinforced by the many states which include civil emergency preparedness under the adjutant general of the national guard. Perhaps it reflects envy stemming from past military command experiences. Perhaps it is in awe of the demonstrated effectiveness of military support when it has been applied in disaster situations. For whatever cause, this attitude is important to consideration of the feasibility of implementing a civil emergency management structure because it provides a substitute for civil responsibility.

The third consideration relates to the present roles of designated overall disaster preparedness organizations. In normal (non-disaster) times, many local officials consider the main activity of FEMA and the state emergency agencies to be administrative oversight of federal and state programs that provide financial support and assistance to local government. Local officials continually object to complex and lengthy planning requirements; they desire simple and short guidance or checklists. Thus, "federal and state preparedness programs are viewed as being bureaucratic and largely unnecessary by local officials." "It would...help if the required paperwork (particularly the multiplicity of planning documents) was reduced so that greater effort could be applied to the local preparedness function" (Reference 28).

As noted, many local officials (particularly operating department heads) consider that their roles are to respond to hazard effects with standard operating procedures (hence, the emphasis on checklists). Many state and federal level officials consider their roles to be to advise and coordinate (FEMA has minimal operating forces, hence no substantial operating responsibilities). Crisis relocation planning is illustrative: FEMA contracts with other agencies to conduct shelter facility surveys. It contracts with research and planning organizations to develop food distribution, transportation, management, medical and many other systems. FEMA provides planning guidance and funds to states to hire (contract) planners to draw plans for local crisis relocation operations. Local officials may participate, mainly by workshop testing and approving the plans. According to the Eisenhower dictum, it is survey, research, and state contract personnel who

are "steeped in problem." These personnel bear no operating responsibilities.

Another fundamental view regards the proper role for top-level emergency organizations. Dynes and Quarantelli observed that: "Patterns of leadership in disaster-impacted communities are very complex...almost all communities are not organized to cope with disasters. This is true even in localities with extensive pre-disaster planning, since there is a considerable difference in anticipating problems and facing them. What disasters do is to create a series of new problems for the community...(which) necessitate new relationships between its parts...Therefore, new social forms have to be created and new relationships forged." (Reference 29) Thus, there is need to communicate the requirement for standby capacity to coordinate and support local activities that will perforce change because of the impact of crisis or hazard effects.

A final consideration is that disaster responses are narrowly focused to the particular event. The California earthquake survey noted, "there are a variety of specialized programs -- usually established in response to some notable event or crisis -- that address portions of the problem posed by natural hazards...Elements of a comprehensive program exist at the state and local level of government and in the private sector, but little attempt has been made to link them together in a coordinated manner..." (Reference 28). Thus, representatives of an agency with particular expertise in the technical aspects of a hazard situation tend to assume overall control of response activities. The FY82 budget request for the entire federal earthquake hazard reduction program was (Reference 14):

|       |                |
|-------|----------------|
| FEMA  | \$ 5,300,000   |
| USGS  | 34,425,000     |
| NSF   | 27,150,000     |
| NBS   | <u>450,000</u> |
| Total | \$67,300,000   |

The FEMA budget was for preparedness planning and improving state and local building codes. It is notable that primary roles were exercised at Mt. St. Helens by the USGS and Forestry Service and at TMI by NRC.

In summary, fundamental considerations for the feasibility implementing the proposed emergency management structure include:

- Disasters are viewed as transient, temporary aberrations, with limited significance to ongoing operations. This leads to relatively low continuing concern at all levels of government.

- The impact of crisis or disaster events requires an unpredictable readjustment of management relationships at all operating levels. Hence, disaster preparedness management organizations are considered irrelevant, or at least someone else's concern. This is reinforced because most top-level pre-disaster activities are onerous administrative burdens to local day-to-day operations.
- Local government is concerned with response to relatively frequent moderate disasters. Catastrophic disasters are considered particular events to be countered by individual, specialized programs, managed by technical personnel from specialized agencies.

These considerations are not isolated to the proposed middle-management center concepts, they apply to any emergency management system.

Prior reports on emergency management concepts (References 1 and 2) outlined other local considerations, as did a report on the "Civil Defense Program of the Federal Emergency Management Agency" by the Surveys and Investigations Staff, House Appropriations Committee (as quoted in Reference 14). The latter report noted that "During numerous interviews with personnel of State civil preparedness organizations, the Investigative Staff was troubled by expressions of discontent and frustration over the Federal Government's role in civil preparedness. Continuous change in organizations from 1951 to present, repeated and short-lived leadership, both at headquarters and regional levels, the continual inconsistency of Congressional appropriations, and the lack of the Federal organizations to pay other than lip service to State recommendations were among the more common complaints heard.

"Frustration was expressed over the abrupt cancellation of Federal matching funds for such programs as EOC's (no funding in FY 1979-1980), and purchase/maintenance of outdoor warning sirens. Complaints were continuous regarding the overall decline in Federal funding. The ever-increasing responsibilities of State and local civil preparedness organizations due to construction of nuclear power plants, transportation of hazardous material, contamination of land and waterways, etc., all of which are inter-State related, combined with the inflation factor, has created a situation of 'do more for less'."

"Many officials at State, Regional, and FEMA headquarters level, held a conviction that until the Federal Executive and Legislative Branches define a



National Emergency Plan designating the essential priorities to be given to civil preparedness and follows with appropriate funding, the Nation will never achieve other than a piecemeal capability to respond to a nuclear attack."

"Of all the comments, however, the most common was over the failure of FEMA and predecessor organizations to set priorities and stick to them. The officials virtually begged for firm priorities, though, as one State Director stated, 'We may not like them'."

The federal administration's budget proposals for FY83, were submitted in February 1982 as this report was being drafted. FEMA's proposed budget is almost double that for FY'82, supporting earlier reports that the President had decided to include civil defense as a part of a stronger strategic defense posture. FEMA's "Enhanced Civil Defense Program to Implement PD-41", December 1979, outlined 5 and 7 year (D and D-prime) moderate cost programs (about \$3 billion) to enhance the survival of civil population in a nuclear exchange. The general thrust of the program is to complete crisis relocation plans and to provide fallout shelter and support systems to achieve the life-saving potential of crisis relocation. The FY'83 budget request does not lay out planned funding for later years, but it does appear to represent initial funding for the D-prime program. While the D-prime program does not call for a comprehensive emergency evacuation management structure (as outlined in Section 5), any such program emphasis should revive interest in emergency management and provide a forum to consider management requirements. Should the D-prime program be implemented, it could also provide the necessary continuity to allow development of the management system. As noted in the Congressional Report, "Since FEMA's creation, the CD program has been funded by annual authorizations. The Investigative Staff believes that mult year funding would improve the overall CD posture and its various program elements. It would require FEMA to determine what the Nation's long-range CD needs are or should be, and then institute necessary, adequately funded programs to achieve such a capability. Since the backbone of the CD program rests with the State and local governments' acceptance and implementation of the various program elements, they need to know both the future CD requirements and the associated funding so they can plan accordingly."

"Multi-year funding of the CD program would be most beneficial to the State and local governments because many function on fiscal year periods that differ from the Federal Government's fiscal year. Knowing what the future program elements are and the projected levels of funding,

the State and local jurisdictions would have a better and more substantive basis of supporting their needs." (Reference 14)

FEMA officials, should the D-prime program be authorized and funded, could logically argue that now is the time and circumstance to change the present passive role of the agency to a leadership role. In this context, federal headquarters and regional operations staffs could be assembled. Out of the federal example, starting with already strong state regional organizations, model evacuation area middle management centers could be nurtured. This nucleus operations management structure could be activated for each declared emergency or disaster condition. Present contingency plans, resources and operations could be evaluated under less than national catastrophic conditions and conflicts and deficiencies ironed out. Local operating jurisdictions could observe middle and top-level organizations assuming responsibilities in a systematic manner with clear, centralized lines of authority. The demonstrated attributes should tend to overcome the negative attitudes which have impeded emergency preparedness programs in the past.

However, the authors of this report recognize the difficulties involved in implementing such a drastic change of course. As Ren F. Read, then Assistant Director of Civil Preparedness (Technical Services) observed regarding the analysis of DCPA Headquarters operations almost a decade ago: "Who should take these clear findings and undertake actions to correct these oversights?...Based on experience it may very well be nobody, unless we invent a mechanism which will pluck out of research reports issues which are ready for treatment and assign them to action officers." (Reference 30). To the authors' knowledge, no such mechanism exists.

## 7. SUMMARY AND RECOMMENDATIONS OF RESEARCH

### 7.1 SCOPE OF RESEARCH

Earlier research studies revealed local weaknesses which led to the concept of a middle management center (MMC). The MMC would coordinate the emergency activities of each evacuation area. It would function as a clearinghouse for intelligence and as a decisionmaking body for the allocation of relocation area personnel and resources. The centers would also serve as a focal point for contacts with state and federal government agencies.

The primary objective of this research was to investigate the roles of federal/state level MMC's to serve emergency evacuation operations. The analyses considered the background and field conditions, the functions and techniques, and feasible means to implement the centers.

- Emergency evacuation studies, reports and guidance materials, including recent reports on local emergency evacuation management requirements and concepts, were reviewed to establish an information base.
- Management, coordination and support requirements of state and federal agencies for disasters involving potential or actual emergency evacuation were defined to establish the roles of decentralized middle management centers to coordinate federal, state and private plans and operations. Management interfaces between state and federal agencies and with private (and quasi-private) organizations were considered.
- A logical pattern was developed to define responsibilities and decision levels for escalating levels of disaster response. Beneficial roles for middle management centers, and the feasibility of implementing the centers under various crisis conditions were considered.
- Field contacts were made with local, state, and federal agency representatives to validate the preliminary findings of the research.

## 7.2 EMERGENCY MANAGEMENT ENVIRONMENT

The overall FEMA program is to assist state and local governments to improve their readiness for life-saving operations and mitigation of damage resulting from natural and manmade disasters and nuclear attack. FEMA has two basic strategies for protecting populations threatened by major hazards. One is to provide the best protection possible with the population "inplace" at or near their homes, schools and places of work if the warning time is short or if people opt not to relocate. The second is for people to leave the threatened area if time allows. The latter involves the orderly evacuation of people from high-risk areas (areas likely to be directly affected by hazards) to low-risk host areas (and their reception, care and protection in the host areas).

Though it is generally accepted that all state and local jurisdictions should be capable of conducting coordinated operations during major emergencies, it is also generally accepted that most local jurisdictions have limited capabilities to prepare special countermeasures for all contingencies. A long history of traditional and legal practices underlies the present structure of emergency organizations in the United States. Local fire, law enforcement and health agencies are structured to deal with moderate disasters at the local jurisdictional levels. Military bases and federal agencies have traditionally supported adjacent civil populations. National guard units, either under state or federal control, have been used for disaster mitigation, control, and relief, and to provide personal and property security. The prestige and financial resources of federal organizations are the bases for significant impact on the policies and procedures of local organizations.

Widely shared views concerning appropriate roles for federal emergency management include:

- FEMA's role is to advise and assist the President in the coordination of emergency activities among the federal agencies (because the head of one agency cannot logically direct the head of another agency).
- FEMA's emergency role is to evaluate the disaster situation and recommend where support by federal delegate resource agencies should be provided.
- FEMA has little operational capability (it commands minimal resources and operational forces), hence it has no substantive operations mission.

- Only in its planning and increased readiness functions is there a semblance of a command and control function -- disguised as "recommendations" to states, because FEMA has no legal pre-disaster authority over the states.

Thus, the pre-disaster views of FEMA operations are widely held to be confined to financial assistance, information processing, agency coordination and contingency planning.

The present emergency management environment may be characterized briefly as follows:

- Federal, state and local governments share emergency responsibilities. Local jurisdictions have basic responsibility for handling moderate disasters within their areas, and normally function effectively with little outside assistance. Should the disaster extend beyond a local jurisdiction, or should it become of greater magnitude than the local officials can handle, the state becomes involved by coordinating and providing resources. Should the disaster reach proportions that overwhelm local government, the state may assume operating responsibility.
- The federal government does not have an extant centralized emergency civil operations management capability. Its authorities and responsibilities are distributed among many agencies. Federal response to state and local emergency needs is typically provided by local military commanders and the heads of federal field agencies on a decentralized basis. The federal government normally acts in a coordinative and supportive role.
- The present, established graduated disaster response systems have worked adequately in the past. Therefore, only considerations of more severe hazards -- "catastrophic disasters" -- can justify the need for a more effective response system.
- Relevant characteristics of catastrophic disasters include severe hazards to large numbers of victims over wide geographical areas; primary and secondary effects lasting long enough so that emergency operations may have to be sustained indefinitely; potential, but uncertain, warning to allow identification of hazard areas; and infrequency to preclude extensive experience with their effect and countermeasures. Possible catastrophic disasters include nuclear warfare, nuclear materials accidents, hurricanes, earthquakes (secondary effects), and the

cumulative effects of lesser disasters. Nuclear war crisis relocation is the most severe condition because it affects the entire nation simultaneously.

- Pre-disaster modification from the present attitudes (and legal authorities) of a passive advisory role to an active central management role for federal civil emergency operations (FEMA) is a prerequisite to establishing a more effective state/federal management system. Recognition and acceptance is needed at all levels of government and industry of requirements for coordinated response to catastrophic disasters, including the need for pre-disaster organization, planning and training.

### 7.3 FEDERAL/STATE LEVEL EMERGENCY EVACUATION ACTIVITIES

The primary mission of federal/state level organizations in emergency evacuation is to support the activities of local jurisdictions to provide for the needs and protection of the population. These organizations may conduct two kinds of crisis operations: First, their forces may be employed in direct support of local operations (i.e., units or individuals assigned from their own forces to augment local forces); second, they can assure local availability of essential goods and services by controlling and expediting production, distribution, and use within the limits of what is available. This requires coordination of the activities of public and private organizations, whose combined efforts are required to transfer available resources to those who need them. Federal/state emergency evacuation activities may be categorized as follows:

- Direction and Control
  - Headquarters operations: Evaluate, decide and implement objectives and procedures. Determine time-phased operations. Establish and maintain secure locations. Prepare emergency regulations to alleviate disaster effects (i.e. modify licensing and regulating procedures, establish consumption controls).
  - Warning: Identify hazards, determine potential effects, evaluate countermeasures, decide actions, promulgate decisions.
  - Communications: Coordinate private and public systems to ensure linkage between essential organizations and centers, and provide control for the integrated network.

- Emergency Public Information: Select media for coverage, appropriateness and redundancy. Communicate state and federal decisions, instructions and background information.
- Economic and Financial: Identify dislocations, determine alternative responses and regulations, make decisions, promulgate decisions.
- Movement, Reception and Care, and Public Safety
  - Movement: Initiate pre-disaster plans to identify risk and host areas and transportation vehicles and routes. Provide personnel and resources to assist movement control.
  - Reception and Care: Maintain contingent support capabilities to augment local operations.
  - Law Enforcement and Fire Protection: Surveillance of local operations to permit reassignment of population. Maintenance of contingent reserves to augment local forces.
  - Medical and Health: Allocate personnel, equipment and resources to local areas to alleviate imbalances. Provide for specialized activities in risk areas.
- Resources, Supplies, and Shelters
  - Supply and Demand: Determine what essential goods and services are to be supplied. Determine the needs of the redistributed population. Specify quantities and recipients.
  - Food Supply: Ensure coordinated private operations at production and wholesale levels to serve relocated population.
  - Medical and Health Supplies: Allocate supplies at production and wholesale levels. Inform private organizations of redistribution of demand.
  - General Supply and Construction Resources: Identify critical resources and allocate to local areas.
  - Transportation: Ensure coordination of resources and needs. Prepare to assume major allocation, coordination and control requirements.
  - Shelters: Coordinate and allocate construction personnel, equipment and supplies for effective utilization.

- RADEF: Coordinate and allocate technical personnel, equipment and supplies.

#### 7.4 ORGANIZATION THEORY

A body of organization theory provides a basis for analyzing and evaluating emergency management and organization concepts. The decisionmaking process begins by determining the objectives of the organization. Three vital functions of the top authority in the executive hierarchy are to interpret the objectives to define activities and to set times for integrated actions. To accomplish these functions, a central clearinghouse is needed to gather intelligence, make decisions, and notify other positions of relevant information and changes in plans or actions. For the central clearinghouse to effectively exercise its authority, communications should be authenticated so the staff can act for and in the name of the top authority.

There is an accepted process of building organization structures: (1) identify objectives and purposes; (2) identify activities; (3) identify decisions; (4) establish a hierarchy of decisions; and (5) derive an organizational structure. The form of the organizational structure is dictated almost entirely by the division of work. The exercise of authority inevitably requires a linear hierarchy between the top authority and the operating units. The allocation of authority in the hierarchy involves considerations of span of control (the number of subordinate units) and decentralization (the delegation of authority to lower eschelons).

Organization theory provides guidelines to analyze and evaluate emergency evacuation management and organization concepts. This guidance tends to be qualitative alternatives -- elements to be evaluated -- rather than quantitative facts or rules. The following applications pertain to this analysis of emergency evacuation management concepts:

- Emergency evacuation will change the locations of products and activities, consumers, and many ongoing essential organizations, requiring the modification of existing management structures.
- Emergency evacuation will decentralize many organizational activities. Of the criteria used to evaluate the effects of decentralization, competence, capacity, and communications are probably most important.



- Span of control applies to emergency evacuation organization in the same sense as decentralization. Overextended spans of control make operations more vulnerable to intelligence and communication failures, to costly judgement errors, and to lack of competence and capacity.
- Local risk and host area organizations represent the operating echelons of the emergency evacuation management structure: they provide for the movement, reception, care and protection of the bulk of the population. They directly control most resources and personnel. However, local management depends on decisions made at higher levels to set overall objectives, allocate resources, and coordinate activities. Higher level management also provides procedures, personnel and resources required to achieve effective and efficient local operations.
- Higher level decisionmaking requires clearinghouses for information. The clearinghouses both centralize intelligence for decisions and promulgate authenticated decisions.

## 7.5 EVALUATION OF PRESENT EMERGENCY MANAGEMENT SYSTEM

Present emergency management concepts and organizations have evolved to meet recurring disaster hazards. Initial responsibility is borne by local organizations, with higher level organizations becoming involved as the severity and extent of the hazard increases. Following the declaration of a state of disaster by a Governor and the President, state and federal civil and military agencies typically commit resources from local and regional levels. The federal activities to support local government remain under the direction of each agency's hierarchy, sometimes coordinated on an ad hoc basis by a lead agency designated by the President. While this system has worked adequately in the past, it has not resulted in a centralized state/federal level organization with trained personnel, procedures and resources.

Evaluation of the emergency evacuation management structure indicates several weaknesses according to accepted organization principles and criteria:

- The overall effect of large-scale emergency evacuation is to disperse population, resources and organizations. Present emergency management planning is to decentralize middle and operating management to

host areas and to centralize decisionmaking management in state-level (or state/region-level) agencies.

- This change shortens the chain of command, which broadens the span of control. Typically, more reliable information, more competence and capacity and clearer lines of authority and coordination are required for this type of organization.
- Anticipated and real catastrophic hazard effects, and the evacuation itself will decrease production and distribution capabilities. Separation of risk area personnel from their normal resources, jurisdictions and organizations will tend to produce conflicts of authority at operating and middle management levels. System reliability and confidence will decrease, and personnel will be faced with unfamiliar decision responsibilities. Significance (cost of mistakes) of decisions, will increase. Thus, middle and top-level management coordination and support requirements will increase.
- The number of demands and amount of information passed up from operating to middle and top-levels will increase, as will the decisions and controls passed down. There will be increased needs for horizontal coordination between both public and private agencies. Normal communication channels will be lengthened, intelligence systems will be disrupted, and normal "clearinghouses" to compile information and authenticate authority will be eliminated. Public information sources will be independent of local control and coordination. Disaster conditions will be unfamiliar and news will be subject to various interpretations. An extraordinary burden will be placed on all communications facilities.

Considering the requirements relative to the resources, capabilities, and flexibilities of present organizations, and to the expectation of moderate disasters, it is difficult to justify any modification of present organizational structure. Considering the requirements relative to large-scale emergency evacuation and catastrophic disasters, especially nuclear war crisis relocation, it is difficult to predict any outcome short of chaos.

## 7.6 DECENTRALIZED FEDERAL/STATE MANAGEMENT STRUCTURES

Civil emergency activities involving evacuation of large numbers of people for prolonged periods are also recognizably different from normal civil (public and private) activities. The state or state/region coordinating centers are designed to meet the unique requirements imposed by these catastrophic disasters. The middle management centers would assume responsibility for activities and coordination not provided by normal government or private organizations. They would operate at a level (the evacuation area) broad enough to overview operating tasks of local organizations on a comprehensive basis. They would be close enough to local operations to have first-hand knowledge of local problems, priorities and needs. Properly staffed, they would reinforce (not dilute) the authorities of state and federal agencies and private organizations.

The nation would be divided into several hundred "evacuation areas" (including both risk and host cities and counties) based on existing state regions, risk/host conglomerates and economic/trading area definitions. This state-region (or evacuation area) would be the first level emergency middle management center. Risk and host area jurisdiction operating units and organizational structures would be maintained. Host area organizations would manage increased demand by expanding operations with auxiliary personnel from the host area and relocatee population. This would be accomplished on a self-help, best-effort, training-on-the-job basis. Specialized risk area operating units would be maintained intact, (not dispersed as "fillers" for host organizations), except for those (e.g., schools) whose clientele were completely dispersed. These organizations would be employed to meet risk area needs or to be dispatched (at host area request and MMC direction) to offer contingent support. Unless prohibited by disaster effects, local public and private essential operations would be managed by department personnel at the usual dispatcher or headquarter sites.

State-region MMCs, formed for each evacuation area, would be delegated authority to act for federal and state governments, and to coordinate public and private organizations in all matters internal to the emergency evacuation area. Other regional middle-management organizations would operate from normal headquarters in communication with the MMC. The MMC also would be responsible for preparing and disseminating public information, for coordinating the upgrading and construction of fallout shelters, and for coordinating RADEF operations. Organization relations would vary between evacuation areas, states and regions of the country.

The MMC staff would include key representatives from local jurisdictions and essential federal, state and industrial organizations. It is important that the individual in charge be a person of stature capable to command public and private community respect. The representatives would coordinate intelligence and operations for jurisdictions on a functional basis. Suitable staff for the MMC should be experienced in emergency operations, competent to make decisions, and command respect at local, state and federal region levels. In addition, they should be intimately acquainted with major evacuation area transportation, communications, and utility networks, and the organizations (private, military, state and federal) that can restore critical outages. Pre-emergency selection, indoctrination and training of qualified personnel is essential.

The MMC should be sited to ensure physical protection and communication capacity. Ideally, it would be located at the population and transportation centroid of the evacuation area, outside the risk area. A mobile MMC would provide flexibility, but would face complex problems. It should be of sufficient size to accommodate all essential communication equipment and personnel; be housed in a temporary protective facility to ensure initial survivability, and have preselected sites that can accommodate key officials.

State (and state-agency) headquarter operations might be relocated to secure facilities. They would coordinate activities between the state-region MMCs and would allocate state resources and personnel between evacuation areas. The national guard would be a vital state resource if it were not mobilized by the federal military.

Federal headquarter operations, while beyond the scope of this research effort, must be conceptualized because the activities of subordinate levels are designed to carry out the objectives, policies and directives of top-level authorities. FEMA's headquarters organizational alignment is viewed as similar to a headquarters military staff responsible for overseeing military operations in several theatres. The headquarters staff would not "operate" in the literal sense of the word; it would make major decisions as to what operations will be conducted, the emphasis and timing of operations, and level of support accorded to each region.

An "Operations Division" for FEMA Headquarters should be heavily staffed with representatives of the federal delegate agencies and the Defense Department. Civil emergency operations for catastrophic disasters are at least as important as military combat operations. The most

expert representatives of those agencies should be detailed to FEMA, not in a loose liaison capacity but as an integral part of the FEMA Headquarters emergency operations division. They would function as the authorities on the organized emergency capabilities and material resources owned or controlled by their parent agencies. Thus, they would be in a position to both assess the feasibility of proposed nationally directed emergency activities and to expedite the organization and application of the resources. They could also distinguish between military and civil priorities.

Federal region coordination centers would represent the middle management level between FEMA and delegate agency headquarters and state and evacuation area centers. The federal regional coordination centers would be responsible for federal activities in each of the FEMA regions. As for the Headquarters, these federal region MMC's should be heavily staffed by personnel from the resource agencies, the military and large private organizations. Operations of these supporting organizations, conducted at evacuation area level, could be directed from normal (or secure relocation) sites. The reorganizational role of regional centers would be to ensure that the major decisions of the Headquarters are implemented. They should know the resources and capabilities of the support organizations, assess the relative needs and priorities of the evacuation areas, and decide which resources to apply where.

To staff the federal regional centers, personnel are needed who are widely experienced in disaster operations, nuclear attack and natural disaster effects, and the probable severe environmental constraints in conducting emergency evacuation operations. These personnel preferably should have been heavily involved in the development of national civil emergency contingency plans, have a realistic knowledge of the organized and material resources likely to be available for conducting emergency operations, the ability to make sound decisions in the face of fragmentary operational situation information, and the ability to skillfully and accurately present requirements of the civil population to higher authority. Key personnel should be drawn from regional federal, military, state, and civil agencies.

#### 7.7 LOGIC TO ALLOCATE RESPONSIBILITIES TO MIDDLE MANAGEMENT CENTERS

The proposed organization structure was derived from analyses of decision requirements according to accepted organization theories. The structure appears to involve the fewest changes from normal organization, and it embodies reasonable dimensions to allow effective decisionmaking. Provision of two levels of emergency middle management centers (the federal and the state region levels) is based on considerations of decentralization and span of control. However, variations between individual areas will be so great as to preclude theoretical prejudgement. The management system can be refined only by accepting a concept of operations, establishing an organization structure and exercising the structure.

The declaration of an emergency or disaster condition would remain a political decision to be determined by governors and the President. Present procedures for escalating disaster effects would be followed (i.e., the local area responds first, if conditions worsen adjacent and higher level organizations become involved). The middle management centers would participate only in activities and to the extent that their unique capabilities were required. Thus, most activities remain with local organizations operating within their jurisdictions. Allocation of decisions between the levels of the federal/state central and regional management structure will depend on qualitative considerations. Decisions requiring rapid response with on-hand resources will be made at evacuation area level. Decisions involving allocations and coordination between evacuation areas will be made at state or federal region level. Far-reaching decisions, such as economic and monetary controls, will be made at federal headquarters level.

#### 7.8 BENEFITS OF MIDDLE MANAGEMENT CENTERS

To deal with the effects of catastrophies -- particularly war-caused -- there is need for direction and control of federal civil activities below Presidential level. At the present time the logical organizational slot appears to be FEMA because it already encompasses many federal emergency coordination and mitigation activities. The delegation of authority to FEMA headquarters and regional coordination centers to direct and coordinate federal activities to counter the effects of catastrophic disaster would not dilute Presidential-level authorities to mobilize and allocate resources. Nor would it dilute authorities of state and local governments to manage their activities -- rather it would provide interstate top-level

administration, resource support and technical expertise on a coordinated basis.

Civil emergency activities involving evacuation of large numbers of people for prolonged periods are recognizably different from normal civil (public and private) activities. The state or state/region coordinating centers are designed to meet the unique requirements imposed by these catastrophic disasters. The middle management centers would assume responsibility for activities and coordination not provided by normal government or private organizations. They would operate at a level (the evacuation area) broad enough to overview operating tasks of local organizations on a comprehensive basis. They would be close enough to local operations to have first-hand knowledge of local problems, priorities and needs. Properly staffed, they would reinforce (not dilute) the authorities of state and federal agencies and private organizations.

Full-scale, all-hazard plans, while obviously an attractive ideal, are seldom achieved: they are expensive, require constant updating and must be adjusted to the particular event. They generally reflect routine organization operations and relationships, and are too abstract and ponderous for rapid response to immediate threats. Local department heads respond to emergencies by applying personnel and resources according to standard operating procedures and observed hazards, most do not consult comprehensive contingency plans. A comprehensive contingency plan drawn in 1982 to deal with a 1985 catastrophe will be quickly obsoleted by environmental and personnel changes. Moreover, the actual catastrophe will seldom precisely fit planning assumptions, and countermeasure procedures will be subject to modification. In another sense, such planning could be vital. Should the federal government implement the concept of emergency federal/state level middle management centers, contingency planning would keep the staffs steeped in the character of their problems, and would provide the basis for training exercises and definition of organization roles.

#### 7.9 FEASIBILITY OF IMPLEMENTING MIDDLE MANAGEMENT CENTERS

FEMA staff members are well aware of the difficulties of initiating and maintaining emergency plans, management staff and operations capabilities when disasters are regarded as improbable events with uncertain consequences. While logically as much as possible should be accomplished as early as possible, it is likely that emergency preparation activities will remain low priority items for

all levels of government. Thus, it must be conceded that it would be difficult to implement the proposed management structure under present conditions and attitudes. In summary, fundamental considerations for the feasibility implementing the proposed emergency management structure include:

- Disasters are viewed as transient, temporary aberrations, with limited significance to ongoing operations. This leads to relatively low continuing concern at all levels of government.
- The impact of crisis or disaster events requires an unpredictable readjustment of management relationships at all operating levels. Hence, disaster preparedness management organizations are considered irrelevant, or at least someone else's concern. This is reinforced because most top-level pre-disaster activities are onerous administrative burdens to local day-to-day operations.
- Local government is concerned with response to relatively frequent moderate disasters. Catastrophic disasters are considered particular events to be countered by individual, specialized programs, managed by technical personnel from specialized agencies.

At the same time, there is encouragement from the experiences of several states (such as Texas), with regional organization and from the apparent federal administration decisions to augment civil emergency preparedness funding. FEMA's proposed FY'83 budget is almost double that for FY'82, supporting earlier reports that the President had decided to include civil defense as a part of a stronger strategic defense posture. The FY'83 budget request does not lay out planned funding for later years, but it does appear to represent initial funding for the D-prime program. While the D-prime program does not call for a comprehensive emergency evacuation management structure, any such program emphasis should revive interest in emergency management and provide a forum to consider management requirements. Should the D-prime program be implemented, it could also provide the necessary continuity to allow development of the management system to include MMC's.

FEMA officials, should the D-prime program be authorized and funded, could logically argue that now is the time and circumstance to change the present passive role of the agency to a leadership role. In this context, federal headquarters and regional operations staffs could be assembled. Out of the federal example, starting with



already strong state regional organizations, model evacuation area middle management centers could be nurtured. This nucleus operations management structure could be activated for each declared emergency or disaster condition. Present contingency plans, resources and operations could be evaluated under less than national catastrophic conditions and conflicts and deficiencies ironed out. Local operating jurisdictions could observe middle and top-level organizations assuming responsibilities in a systematic manner with clear, centralized lines of authority. The demonstrated attributes should tend to overcome the negative attitudes which have impeded emergency preparedness programs in the past.

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Earlier research studies revealed local weaknesses which led to the concept of a middle management center (MMC). The MMC would coordinate the emergency activities of each evacuation area. It would function as a clearinghouse for intelligence and as a decisionmaking body for the allocation of relocation area personnel and resources. The centers would also serve as a focal point for contacts with state and federal government agencies. They would not duplicate local personnel and operations at present EOCs.

The objective of this research was to investigate the roles of federal/state level MMCs to serve emergency evacuation operations. The analysis considered the background and field conditions, the functions and techniques, and the benefits and feasible means to implement the centers.

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